THE GLOBAL VILLAGE

Transformations in World Life and Media in the 21st Century

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Contents

Is it a fact . . . that, by means of electricity, the world of matter has become a great nerve, vibrating thousands of miles in a breathless point of time? Rather, the round globe is a vast head, a brain, instinct with intelligence! Or, shall we say, it is itself a thought, nothing but a thought, and no longer the substance which we deemed it!

NATHANIEL HAWTHORNE
(*The House of the Seven Gables*)

Preface

I

Marshall McLuhan and I constructed this book from two points of view: the aesthetic and the technologic. Chapters 1 to 6 are an aesthetic meditation on how Marshall arrived at the tetrad through art and rhetoric. Chapters 7 to 9 concentrate on electronic communication technologies and demonstrate how speed-of-light technologies could be used to postulate possible futures. One might determine the final end of each electronic technology by its intensive enlargement or amplification. The four phases of the tetrad manifest the cultural life of an artifact in advance (whether it be a computer, data-base device, satellite, or global media network) by showing how a total saturated use would produce a reversal of the original intent.

To McLuhan, graphing the human use of an artifact could predict what society might do with a new invention. Hence, one could accept or reject from the beginning the future effects of any new artifact. For example, had a tetrad been constructed of the total human effects of atomic energy, we might have deployed all our secret services during World War II to frustrate the use of the atom as a weapon for any combatant, including ourselves. In more recent times, we might have foreseen that the effects of the contraceptive pill would create a deep birthrate plunge in many Western societies.

McLuhan believed an investigation of this book's precepts, his last collaborative work, would prove out his most profound thought: that the extensions of human consciousness were projecting themselves into the total world environment via electronics, forcing hu-

mankind into a robotic future. In other words, man's nature was being very rapidly translated into information systems which would produce enormous global sensitivity and no secrets. As usual, man was unaware of the transformation.

Because the present is always a period of painful change, every generation views the world in the past—Medusa is viewed through the polished shield: the rearview mirror. The Romans were obsessed with the world of Greece, the Greeks with the tribalists who preceded them (including that great primitive Socrates, whom Plato worshipped all his life). Plato did not have a clue as to what had brought literacy into the world or what it had done to philosophy. He spent his life as an amanuensis of Socrates, turning orality into an art form so as to cope with the new written literacy. But this is normal. People spend their lives making reasonable simulations of what has been done in the preceding age. The Renaissance man lived in the Middle Ages, mentally and imaginatively—deeply thrust through with uncritical classicism. The nineteenth-century man lived in the Renaissance. *We* live in the nineteenth century. The image that we have of ourselves, collectively, in the Western world is from that period. Tom Wolfe looks like a reconstituted Horace Greeley. Sherlock Holmes reigns on public television as an encyclopedic hero, a posture he would not have achieved in Victorian England. The typical American suburbanite lives in the frontier world of the nineteenth century; for him, Luke Skywalker is simply Billy The Kid revisited.

What is happening at the present time is that changes are occurring so rapidly that the rearview mirror does not work anymore—at jet speeds, rearview mirrors are not very useful. One must have a way of anticipating the future. Humankind can no longer, through fear of the unknown, expend so much energy translating anything new into something old but must do what the artist does: develop the habit of approaching the present as a task, as an environment to be discussed, analyzed, coped with, so that the future may be seen more clearly.

The tetrad replays various futures; it suggests experimental alternatives. The tetrad can therefore shift our perceptive focus from the past into the present. Take, for example, the book. Xerox makes it possible for every person to become his or her own publisher. We no longer need to mechanically print, repetitively, a

particular text with little change. We can make a book to which people can constantly add pages—if necessary, from other books. Add the electronic data base for exploration and one might have access to the most unlikely combinations. Unlikely combinations produce discovery. *The Global Village* is not a nineteenth-century book, one of encyclopedic expectations; it is a book which never has the final answer, which brings the past into the present for the purpose of seeing an alternative future, a future where the whole of the economy appears to be moving rapidly toward tailor-made, individually committed services.

Marshall McLuhan, in his final years, wanted to talk to a new generation, one which was twenty to twenty-five years beyond *Understanding Media: The Extensions of Man* (1964). He said that the sons and daughters of the "Flower Children" would transform the world because they would find words to translate what had been ineffable to their parents.

The ineffable to McLuhan was what was dimly seen by those at Woodstock and Haight-Ashbury—that the entire world was in the grasp of a vast material and psychic shift between the values of linear thinking, of visual, proportional space, and that of the values of the multi-sensory life, the experience of acoustic space. Culturally, what is happening now is titanic. It needs a completely new frame of reference. McLuhan provides one. He presents it in a triad of new terms: visual space, acoustic space, and the tetrad. *The Global Village* is devoted to defining and explicating all three as it shows how world culture is repositioning itself to accept a completely different perceptive mode—the mode of the dynamically many-centered.

Visual space is the mind-set of Western civilization as it has proceeded over the last 4000 years to sculpt its monolithic linear self-image—a self-image which emphasizes the operation of the left hemisphere of the brain and which, in the process, glorifies quantitative reasoning.

Acoustic space is a projection of the right hemisphere of the human brain, a mental posture which abhors priority-making and labels and emphasizes the pattern-like qualities of qualitative thinking. McLuhan pointed out repeatedly that the passion of the visual space mind-set leaves little room for alternatives or participation. When no provision, for example, is made for two entirely different

points of view, the result is violence. One person or another loses his identity. Acoustic space is built on holism, the idea that there is no cardinal center, just many centers floating in a cosmic system which honors only diversity. The acoustic mode rejects hierarchy; but, should hierarchy exist, knows intuitively that hierarchy is exceedingly transitory.

McLuhan espoused oriental values as primarily acoustic. Encyclopedic visual space is a mode developed by Plato, polished by Aristotle, and injected wholesale into Western thinking. The two value systems have interpenetrated each other for centuries, certainly when passed from hand to hand in slow print form. But, now the acoustic and the visual are separately slamming into each other at an explosive speed of light. Electric flow has brought differing societies into abrasive contact on a global level, occasioning frequent worldwide value collisions and cultural irritation of an arcing nature, so that, for instance, when a hostage is taken in Beirut an entire nation on the other side of the world is put at risk. McLuhan said, "in the last half of the 20th Century the East will rush Westward and the West will embrace orientalism, all in a desperate attempt to cope with each other, to avoid violence. But the key to peace is to understand both systems simultaneously."

Simultaneous understanding, or "integral awareness," can be seen in the tetrad. McLuhan invented the tetrad as a means of assessing the current cultural shift between visual and acoustic space. At present, every artifact of man mirrors the shift between these two modes.

In this book, we present a model for studying the structural impact of technologies on society. This model emerged from a discovery that all media and technologies have a fundamentally linguistic structure. Not only are they like language but in their essential form they *are* language, having their origins in the ability of man to extend himself through his senses into the environment.

Our research, at the Centre for Culture and Technology in Toronto, constituted an inquiry into the formal aspects of (linguistic) communication which, in the process, uncovered a tetradic structure: all media forms (a) *intensify* something in a culture, while, at the same time, (b) *obsolescing* something else. They also (c) *retrieve* a phase or factor long ago pushed aside and (d) undergo a modification (or *reversal*) when extended beyond the limits of their potential. The result is a four-part metaphor.

When this four-part "structure of the word" (*logos*) is applied to technologies one is able to ascertain the dynamic and social impact of any human artifact on the society into which it is extended; this can be formulated in a simple four-part analysis which is inclusive and, apparently, irreducible. In *The Global Village* we have confined our most widespread analysis to the approaching worldwide impact of video-related technologies which, in their present guise, forecast the most foreseeable future.

For Marshall McLuhan, the meaning of meaning was relationship. In the writing of this book from 1976 to 1984, I was swept into the ideational whirl of his family and associates. In the late forties, Marshall debated poetics with Ezra Pound at Saint Elizabeth's and, through letters, drifted into an intense exchange of critiques concerning Pound with others, such as Hugh Kenner and Felix Giovanelli. In a similar way, I was caught up in a quick-fire exchange of analytical facts and opinions with Marshall, his friends, and colleagues, both in Toronto and elsewhere. McLuhan and I talked; made critical tapes on our ideas; and revised commonly circulated preparatory texts, especially on the structuring of the tetrad. Marshall would take the same ideas and share them with such luminaries as Glenn Gould, John Cage, and Pierre Trudeau. Constant refinement through the minds of others was his way of working. In discussing his penchant for sharing his ideas in development with whoever would listen, McLuhan once told Eric McLuhan and myself—Eric, who was so important in later years in helping his father to record ideas and conversations for revision—"Truth is not matching. It is neither a label nor a mental reflection. It is something we make in the encounter with the world that is making us. We make sense not in cognition, but in replay. That is my definition of intellection, if not, indeed, scholarship. Representation, not replica."

II

In the weeks just before his final stroke in 1979, McLuhan was preoccupied with death. The thought had sprung out of our dis-

cussions about the central metaphor of *Understanding Media,* the Narcissus myth.

One Saturday morning, in examining the opening of our book, *The Global Village,* Marshall noticed the relationship between the astronauts' first view of the earthrise (see Chapter 1) and the mirror image percept he had first examined in 1963. When we went to the moon, he said, we expected photographs of craters; instead, we got a picture of ourselves. Ego trip. Self-love.

The mirror image, I countered, is another way of saying water, which stands for change in man and nature. Narcissus fell in love with his image in the water. "No," said Marshall, "that's the popular conception." Narcissus, as Ovid paints him, is a primal youth, has never seen a mirror or his image. "He fell in love with someone else." That's the mythical and satirical point. For him, the watery mirror was death.

Marshall paused and walked across the living room to place a log on the fire. "Had you thought of the nature of hell in ancient Near Eastern literature?" I asked Marshall. Hell is a watery place. Remember Gilgamesh. The Bible refers to it as Sheol. The Greek shades wander in a dark and misty underworld. By concentrating only on the watery image, Narcissus performs a sort of dreamlike closure, Marshall said. Eventually, like Alice, he must pass through the vanishing point, to see both sides of the mirror. Marshall seemed thunderstruck. "That's what death must be like; one sees oneself simultaneously, as oneself and as the other." Like seeing your own face, warts and all, on the TV screen for the first time. The actor without his makeup. The anchorman without his hairpiece. Christ walks on the water. Peter falls through it. Water is death for humans and a container for the diabolic.

"The diabolic?" I said. From a Christian viewpoint, the Devil brought death into the world. When we outer ourselves, we are in a saving community, the realm of consciousness. When we are innering, within ourselves, through the mirror as it were, we are in danger of being lost in the funhouse of our unconscious. Trapped inside one's skull. A definition of insanity? It's quite explicit in the Gospels: "Unless you die again, you cannot be reborn." That's Poe's maelstrom; into the vortex and out again, surviving not only because you travel light but are prepared to jettison everything. One dies and is reborn. One is immersed and rises again. The

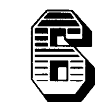
cross of the pagan: he cannot return from hell. Judgment Day for the Christian is seeing himself on earth and in the hereafter simultaneously, which is the unique characteristic of speed-of-light technologies. "When you see yourself on TV, as I have, you are innering and outering simultaneously." A diabolical plot? (Later, McLuhan's letters would reveal that he told Jacques Maritain that the Prince of this world must be a great electrical engineer.) We concluded that video-related technologies might produce a form of psychological death for all mankind by separating it permanently from the natural order, the book of nature, through Narcissus-like self-involvement, a conclusion reached by McLuhan operating on three analytical levels at once: the perceptual, the historical and the analogic. That was McLuhan's rhetorical style, to explore, and re-explore, a subject with a myriad of ideas, each seeming to have an equal judgmental weight, rather than a single point of view. I hope this explanation is of some help to the first-time reader. *The Global Village,* after all, is the first right-hemisphere book as well as McLuhan's last work.

As I review the copyedited manuscript I am pleased that so many of our tetradic projections are as relevant in 1988 as they were when *The Global Village* was being put together (from 1976 to 1984). Yet new technologies are arising which beg for analysis, like cellular phone systems and digitally controlled 360-degree film projection processes. But that's another book.

Lewiston, New York
August 8, 1988

B. R. P.

Lowell Thomas used to say, "On the air, you're everywhere. . . ." The robotic man is capable of instant adjustment to any social situation without guilt; since he keeps his ear tuned to a collective, a moral identity which we call the audience. Like the attentive crowd, an audience is tuned ground.



Hidden Effects

All of man's artifacts, of language, of laws, of ideas and hypotheses, of tools, of clothing and computers, all of these are extensions of the human body. Man cannot trust himself with his own artifacts. The tetrad is needed to reveal any artifact's subliminal effects. Every artifact is an archetype, and the ongoing cultural recombination of old and new artifacts is the engine of all invention and drives the subsequent wide use of invention, which is called innovation.

If you have ever sat in a hot and airless lecture room trying to follow the speaker's line of argument, you have experienced the psychic nature of a figure: it is the momentary area of your mind's attention. As you sit there, you will notice perhaps successively a sudden shift in the air, the radiator knocking, an insect buzzing between the screen and the pane, or the pressure of your legs against the chair. Within the context of all the things that exist in that room, points of awareness (attention) will arise and recede. In a larger sense, nothing has meaning except in relation to the environment, medium, or context that contains it. The type on this page is the figure against the ground of the blank page. The figure of the geometric construct is revealed against the void in which it is imagined. The left hemisphere of the brain is figure against the ground of the right brain in Western culture and the opposite for the Oriental.

In his book *Out of Revolution,* Eugen Rosenstock-Huessy explains how the figure of Western capitalism has persisted in a pro-

gram of advance by environmental destruction, without any policy of replacement of such (environmental) ground. By contrast, the right-hemisphere man, like the primitive hunter, who has learned to move through nature rather than against it, is always intensely aware of ground and, in fact, prefers ground and the experience of participation in ground to the detached contemplation of figures. Chiang Yee points to the rejection of (visual) matching and representation in Chinese art:

> Verisimilitude is never a first object; it is not the bamboo in the wind that we are representing but all the thought and emotion in the painter's mind at a given instant when he looked upon a bamboo spray and suddenly identified his life with it for a moment.

He further notes:

> . . . we try, in the steps of the Sages, to lose ourselves in Great Nature, to identify ourselves with her. And so in landscapes, in the paintings of flowers and birds, we try not to imitate the form, but to extract the essential feeling of the living object, having first become engulfed in the general life stream.

The Oriental aspires not merely to love and understand a painting itself, but to probe for a meaning far beyond its confines in a world of the spirit. On these right-hemisphere terms, figure painting is a peculiar Western preoccupation that is devoid of satisfaction:

> We have never elevated figure-painting as you have in the West; some of it may have religious significance, but it seldom reaches the depth of thought which landscape attains.[1]

Until the advent of the expressionists and the cubists, art in the West was in thrall to Renaissance perspective and individual portraiture, requiring a detached observer. By tuning in on the new audile-tactile awareness made available these days by our electronic ground, Fritjof Capra found that modern physicists were, unwittingly, retrieving a worldview which is harmonious with ancient Eastern wisdom. His problems in reconciling the two were entirely those of the hemispheres:

> I had gone through a long training in theoretical physics and had done several years of research. At the same time, I had become very interested in Eastern mysticism and had begun to see the parallels to modern physics. I was particularly attracted to the puzzling aspects of Zen, which reminded me of the puzzles of quantum theory. At first, however, relating the two was a purely intellectual exercise. To overcome the gap between rational, analytical thinking and the meditation experience of mystical truth, was, and still is, very difficult for me.[2]

A. R. Luria's observations provide an understanding of how the written alphabet with its lineal structure was able to create the conditions conducive to the development of the Western mental ethos, especially science, technology, and rationality. Many left-hemisphere stroke patients become aphasic, losing some or all of their ability to speak or to write and, in some cases, also losing the capacity for sustained (sequential) thought. They seem to become "astonied" (fifteenth-century English) or stunned—the experience not unlike being stoned on drugs or alcohol.

In part, this condition may be due to a loss of muscular motor control. But much of it is directly related to the inner-outer split between the hemispheres and to the linearity feature of the left side of the brain. In effect, some stroke victims are unceremoniously dumped into the processes of the other hemisphere which is not proficient in reading, writing, and naming. Left-brain centered speech and writing has to be uttered in a sequence. Just as all forms of sequential activity (as contrasted to configurational or pattern) are functions of the left hemisphere, so too all forms of utterances (and artifacts), whether technological, verbal, or written, are functions of the left hemisphere.

This extends to private identity—uttering of the self as fragmented and abstracted from the group—and to entrepreneurial aggression of all kinds. Conversely, all technologies that emphasize the outer or the abstract or sequentiality in organizing experience, contribute to left-hemisphere dominance in a culture. Harold Innis remarked on the Oriental (right hemisphere) antipathy to sequence and abstraction and precision:

> Social time, for example, has been described as qualitatively differentiated according to the beliefs and customs common to a group and as not continuous but as subject to interruption of actual dates. It is influenced by language which constrains and fixes prevalent concepts and modes of thought. It has been argued by Marcel Granet that the Chinese are not equipped to note concepts or to present doctrines discursively. The word does not fix a

> notion with a definite degree of abstraction or generality but evokes an indefinite complex or particular image. It is completely unsuited to formal precision. Neither time nor space is abstractly conceived: time proceeds by cycles and is round. . . .[3]

Dr. Joseph Bogen, the surgeon who participated in the initial split brain operations with Phillip Vogel, noted, appositely, "what may well be the most important distinction between the left and right hemisphere modes is the extent to which a linear *concept* of time participates in the ordering of thought."[4] It was the dominance of the left hemisphere by means of the civilizing stream of phonetic literacy, linked with the time concept, that enabled Western man to detach himself from participation in his surroundings. His program to conquer nature is but one result of the enormous psychic and cultural energy released by that ground of specialist goals.

It is always the psychic and social grounds, brought into play by each medium or technology, that readjust the balance of the hemispheres and human sensibilities which are in equilibrium with those grounds. As we mentioned before, the experience of youthful Jacques Lusseyran in his blinded state amply illustrates how the shift of any component in the sensorium creates an entirely different world:

> When I came upon the myth of objectivity in certain modern thinkers, it made me angry. So there was only one world for these people, the same for everyone. And all the other worlds were to be counted as illusions left over from the past. Or why not call them by their name—hallucinations? I had learned to my cost how wrong they were.
>
> From my own experience I knew very well that it was enough to take from a man a memory here, an association there, to deprive him of hearing or sight, for the world to undergo immediate transformation, and for another world, entirely different but entirely coherent, to be born. Another world? Not really. The same world rather, but seen from another angle, and counted in entirely new measures. When this happened, all the hierarchies they called objective were turned upside down, scattered to the four winds, not even like theories, but like whims.[5]

Lusseyran was made particularly aware of the right-hemisphere inner experience afforded by blindness by having lived in an objective left-hemisphere culture. Blindness creates the *seer* much as the ancient world conceived the *seer* as blind.

> Blindness works like dope. . . . But, most of all, like a drug, it develops inner as against outer experience, and sometimes to excess.[6]

In our culture the parallel is the caricature of inner or right-hemisphere awareness experienced by the drug culture of hallucinogenics that provide an artificial mimesis of the electronic information environment. The literate Westerner approaches the study of media in terms of linear motion or sequential transportation of images as detached figures (content), while the right-hemisphere approach is via the ground of environmental media effects instead.

At this point in our discussion, in the context of figure-ground, we come to the core of the matter as far as students of the media are concerned. The basis of all contemporary Western theories of communication—the Shannon-Weaver model—is a characteristic example of left-hemisphere lineal bias. It ignores the surrounding environment as a kind of pipeline model of a hardware container for software content (Fig. 6.1). It stresses the idea of inside and outside and assumes that communication is a literal matching rather than making.

> The *information source* changes this message into the signal which is actually sent over the *communication channel* from the transmitter to the *receiver*. In the case of telephony, the channel is a wire, the signal a varying electrical current on this wire; the transmitter is the set of devices (telephone transmitter, etc.) which change the sound pressure of the voice into the varying electrical current. . . . In oral speech, the information source is the brain, the transmitter is the voice mechanism producing the varying sound pressure (the signal) which is transmitted through the air (the channel). In radio, the channel is simply space, or the aether (if anyone still prefers that antiquated and misleading word), and the signal is the electromagnetic wave which is transmitted.
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> The *receiver* is a sort of inverse transmitter, changing the trans-

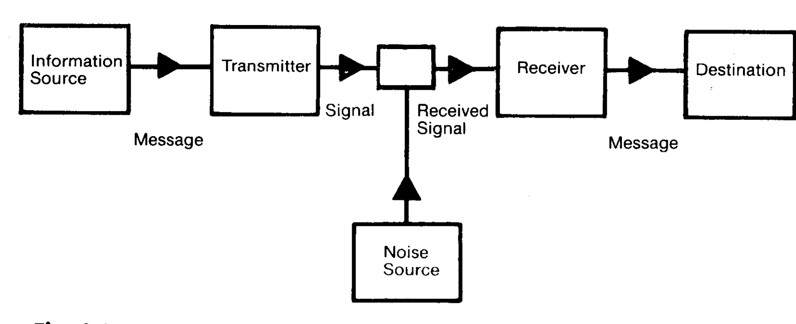


Fig. 6.1.

> mitted signal back into a message, and handing this message on to the *destination*. . . .
>
> In the process of being transmitted, it is unfortunately characteristic that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound (in telephony, for example) or static (in radio), or distortions in shape or shading of picture (television), or errors in transmission (telegraphy or facsimile), etc. All of these changes in the transmitted signal are called *noise*.[7]

Claude Shannon presents his theory of communication in terms of left-hemisphere verisimilitude as a first object:

> The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently, the messages have *meaning*.[8]

In point of fact, the multiplicity of side effects of any communication system forms an entire environment of interfacings, a kind of subculture which accompanies the central service of communication. For example, the side effects of the Alaska pipeline were the subject of a large report by the Berger Commission. The gist of this report was that the entire native population would be deprived of its environmental livelihood were the pipeline to be built. In the same way the side effects of telephone or radio assume a complex system of electronic technology and supporting services, the adoption of which serves as a new ground that transforms an entire society. Radio bulletins on the hour, for instance, destroyed the *Five Star Final*. Equally, the system of roads, manufacturers, and services that are the side effects of the car have altered the entire face (and odor) of any user society.

We are all trapped in an assumption about the nature of reality and a manner of thinking that has been the hallmark of Western civilization since before the time of Aristotle; the Shannon-Weaver model of communication is simply an extension of that bias. The model and its derivatives follow the linear pattern of efficient cause, the only sequential form of causality in Western philosophy.

Aristotle provides the earliest systematic treatment of causes by drawing together Plato's observations. Aristotelian causality is fourfold, and is applicable both to nature and to artifacts. There are:

> . . . the material cause (the scholastic *causa materialis*), which provided the passive receptacle on which the remaining causes act—and which is anything except the matter of modern science; the formal cause (*causa formalis*), which contributed the essence, idea, or quality of the thing concerned; the motive force or efficient cause (*causa efficiens*), that is, the external compulsion that bodies had to obey; and the final cause (*causa finalis*) was the goal to which everything strove and which everything served.[9]

Originally, the first two causes were regarded as related to how things come into *being* and the last two were associated with the process of *becoming*. All were thought to exist simultaneously. In fact, this doctrine of simultaneous causes lasted until the advent of the Gutenberg era when print (as a ditto device) gave complete ascendancy to visual space. Visual space stresses the detached observer. The detached observer is, ipso facto, placed outside of the frame of experience, and hence the idea of scientific method is born. It is our Renaissance legacy. Have you ever noticed when looking at a Raphael or Caravaggio that the vanishing point produces a certain self-effacement for the viewer? No involvement. (A piazza for everything and everything in its piazza!)

Galileo was ravished by proportional and connected space; he reformulated the definition of efficient cause as the only necessary and sufficient condition for the appearance of something: "that and no other is to be called cause, at the presence of which the effect always follows, and at whose removal the effect disappears." He did not appear to be aware that the right hemisphere, which has today its echo in the instantaneous world of electronic infor-

mation, involved all of us, all at once. No detachment or frame is possible.

When the concept of Renaissance visual space transformed cosmology and the *logos* alike from resonant ground to rational figure, the understanding of the original idea of formal causality (the structure, essence, or pattern of that which is being realized) was changed from a dynamic to the abstract and the ideal. We have to keep in mind that Aristotle was partially responsible for the confusion because in his own ruminations he had retained and confused both the oral and visual natures of formal cause.[10]

Final cause (that which is the end or purpose of a process), inherent in a thing from the outset, came to be misinterpreted in left-hemisphere terms only as the end point of a whole series of efficient causes. (We must remember that efficient cause refers to learning about something, like a car, by using it.) Formal cause refers to the defining formula or definition of a thing's essence (its form or the "whatness" whereby we know a thing). In other words, at the very least, formal cause and final cause were made subordinate to efficient cause. If it works, it should be allowed to exist.

But prior to the ascendancy of visual space, formal cause was part of a broader spectrum of related considerations; it intersected with *logos* as a figure-ground concern with the entire thing brought into being, structurally inclusive of the whole pattern of side effects on the ground of the users. The first question that could be asked was not whether it was possible to create something, but whether it was desirable in human terms.

In the left hemisphere, formal cause is translated into a kind of Platonic abstract ideal form that is never perfectly realized in any material example. Such is the understanding of Northrop Frye, one of the principal modern exponents of Platonic and Aristotelian ideas as passed through Freud and Jung. He is consistent in his left-hemisphere approach. Referring to the Jungian doctrine of archetypes, Wimsatt and Brooks comment that,

> For Northrop Frye the discovery points to the possibility of turning literary criticism for the first time into a true science. No true science, he argues, can be content to rest in the structural analysis of the object with which it deals. The poet is the only *efficient cause* of the poem, but the poem, having form, has a formal cause that is to be sought. On examination, Frye finds this formal cause to be the archetype.[11]

Frye is adamant on the point:

> An original painter knows, of course, that when the public demands likeness to an object, it generally wants the exact opposite, likeness to the pictorial conventions it is familiar with. Hence, when he breaks with these conventions, he is often apt to assert that he is nothing but an eye, that he merely paints what he sees as he sees it, and the like. His motive in talking such nonsense is clear enough: he wishes to say that painting is not merely facile decoration, and involves a difficult conquest of some real spatial problems. But this may be freely admitted without agreeing that the formal cause of a picture is outside the picture, an assertion which would destroy the whole art if it were taken seriously.[12]

There is absolutely no provision in Frye's statement for ground of any kind: the archetype is itself a figure minus a ground, floating around devoid of its original context. Otherwise, it would be perfectly natural to observe, along with the rhetoricians and the grammarians, that the formal cause of the poem, painting, or whatever is to be located in the ground. In this sense the ground is the audience (user) and the configuration of sensibilities in the culture at the time the artifact was produced. During World War II, clandestine radio operators on both sides of the fray were frequently more concerned about the effect of the message being sent than its actual content. The message could be false or true depending on the intent of the sender. Agents in the field were known to send back consistently false messages according to prior instruction from headquarters. For a while the entire German spy network in Britain was run by Great Britain and her allies constructing a message environment, through double agents, which appeared to be true. It was a climate of disinformation geared entirely to the users, the Germans.

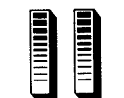
The four causes as a mode of exegesis of nature had been regarded as parallel to the four levels of interpretation of scripture by medieval grammarians (e.g., Saint Bonaventure).[13] In each case, the "fours" were simultaneous, and both systems were rendered obsolescent by the Renaissance push into visual space and left-hemisphere dominance. Figure-ground resonance and the in-

terplay of levels and causes were eliminated. This had the further advantage, from the standpoint of those who wanted to break from the past, the *moderni,* of cutting all bondage and allegiance to the traditions of the monkish scribe. Bunge summarizes the practical left-hemisphere advantages of dumping manifold causality:

> Some of the grounds for the Renaissance reduction of causes to the *causa efficiens* were the following: (a) it was, of all the four, the sole clearly conceived one; (b) hence it was mathematically expressible; (c) it could be assigned an empirical correlate, namely; an event (usually a motion) producing another event (usually another motion) in accordance with fixed rules; the remaining causes on the other hand were not definable in empirical terms, hence they were not empirically testable; (d) as a consequence, the efficient cause was controllable; moreover, its control was regarded as leading to the harnessing of nature, which was the sole aim of the instrumental (pragmatic) conception of science. . . .[14]

Hence, all Western scientific models of communication are—like the Shannon-Weaver model—linear, logical, and sequential in accordance with the pattern of efficient causality.[15] These are all in the figure-minus-ground mode of the left hemisphere; and, in contrast, do not relate to the instant effects of simultaneity and discontinuity and resonance that typifies one's experience in an electronic culture. The nature of sequential time was such, for example, in the eighteenth century that it was possible to "wait and see." George Washington once remarked, "We haven't heard from Benjamin Franklin in Paris this year. We should write him a letter."

For use in the electronic age, a right-hemisphere model of communication is necessary, both because our culture has nearly completed the process of shifting its cognitive modes from the left to the right hemisphere, and because the electronic media themselves are right-hemisphere in their patterns and operation. The problem is to discover such a model that yet is congenial to our culture and its residua of left-hemisphere orientation. Such a model would have to take into account the apposition of both figure and ground (left and right hemispheres working together and independently when necessary) instead of an abstract sequence or movement isolated from ground.



THE GLOBAL EFFECTS OF VIDEO-RELATED TECHNOLOGIES



Global Robotism: The Satisfactions

Robotism, or right-hemisphere thinking, is a capacity to be a conscious presence in many places at once. It is a right-hemisphere mode—the dominant brain mode of the extended mechanical abilities of our bodies, keyed to one time and one place. Communication media of the future will accentuate the extensions of our nervous systems, which can be disembodied and made totally collective. New population patterns will fuel the shift from smokestack industries to a marketing-information economy, primarily in the U.S. and Europe. Video-related technologies are the critical instruments of such change. The ultimate interactive nature of some video-related technologies will produce the dominant right-hemisphere social patterns of the next century. For example, the new telecommunication multi-carrier corporation, dedicated solely to moving all kinds of data at the speed of light, will continually generate tailor-made products and services for individual consumers who have pre-signaled their preferences through an ongoing data base. Users will simultaneously become producers and consumers.

Nineteenth-century America concentrated on the uniform ethos of a smokestack economy: to be specialist, isolated, and self-directed in its world aims. Extractive industries and agriculture held dominion. A left-hemisphere sense of significant order held sway.

The U.S. population was relatively small and determined to spread itself as far west as possible. Like James Fenimore Cooper's Leatherstocking, Americans were always moving over the hill, through the forest, to the next clearing.

Twentieth-century America, from now until about 2020, will not be engaged single-mindedly in raising crops or throwing up steel mills as much as nurturing people, in an inner-directed way, largely as a result of legal and illegal immigration. Military adventures in Japan, China, Southeast Asia, and Central America have brought about and will continue to be the source of continuous migrations to the American mainland, which will splinter the white, Anglo-Saxon cast of U.S. government, education, and business structures and create a salad-like mélange of ethnic minorities without any single one being predominant.

The recipients of this racial trek will be the supercities of the West Coast and Atlantic South, cities which have doubled or tripled in size as the United States has passed through its century-old movement from country to city and air-conditioning has made year-round work possible. (For example, the Los Angeles–Long Beach area should grow from 3.2 million to 10.1 million in 2033. Dallas–Fort Worth should go from 3.6 million to 7.7 million.*)[1]

Many extractive, agricultural, and low-level manufacturing industries—largely due to high labor costs—will be lost to Third World countries, transforming the United States and some parts of Canada into hard-scrabble competitors in the making of "high-ticket" consumer goods, like consumer robotics and electric commuter cars. While a segment of the U.S. population will be educated and mentally attuned enough to become participants in high technology, most native-born Americans will be unprepared for the new consumer economy which will emerge, offering service-related jobs not always suited to their intelligence or training. Ethnic diversity will help to ignite a full-blown economy based on information exchange.

The Chinese, Japanese, Koreans, Arabs, Lebanese, Mexicans, Central Americans, and Indians who are washing up on U.S. shores by the tens of thousands, legally and illegally, will be well served by the new media technologies. Hundred channel cable

* The metropolitan parameters of Los Angeles, including Los Angeles and Orange counties, had already expanded to 13.1 million by July 1986.

systems will be divided up by culture and language. (Already a hundred and seven languages are being spoken in Southern California.) Videocassettes and videodiscs will spawn new markets for ethnic music, cinema, and stage productions. Regional banks will employ electronic means to create new lending and accounting methods geared to minority traditions of handling money. Neighborhood schools, as in the last century, will be tailormade linguistically. Whether rich or poor, the new ethnics, largely as a backspin against too rapid assimilation, will develop complex and self-integrated barrios.

Although most third- and fourth-generation Americans will be numbed by the coming changes, government and business leaders, with recent foreign backgrounds, will be quick to recognize one inescapable fact about U.S. cities: whereas, in the past, they were primarily transfer and warehousing points for railroad, air, and sea trade, by 1994 many principal cities will be a gestaltic political conglomeration of whites, blacks, Asians, and Hispanics fighting with each other for what is left of the economic pie in a nation of a declining birthrate of native-born Americans and an aging white population. In many older cities, like Buffalo and Detroit, the tax base will have foundered due to a loss of trade functions and heavy industry, prompting a furious competition for federal support.

In those cities, the age of acoustic space in politics will surface with a vengeance. Centers everywhere and margins nowhere in a new tribalism. We may very well see ethnic barrios organizing themselves into self-sufficient, electronically coordinated enclosures, where old-style, ward-heel politics will flourish at the speed of light. The *ma* style of each barrio politician will be his ability to reduce conflicts within his own group and mitigate abrasions with other minorities, maintaining a carefully cultivated separatist image to the rest of the community.

After a generation or two, physical proximity should give way to electronic proximity as the new ethnics intermarry and travel to more remote parts of the country. They will want to keep their parental roots as well as go with the flow of assimilation. Hence, one may expect the construction of special electronic data services to fulfill that need.

The new immigration will help fuel an economic and political

surge in the United States and Canada, during the next fifty years, that will have as its ground, or sub-environment, the so-called information age. Computers and sophisticated telecommunication systems should combine to produce work for 80 percent of the population, making the transition complete from an economy based on heavy industry to a marketing, service-oriented economy, having the needs of the singular consumer at its center. But as we have indicated in the first half of this book, the essential change in the U.S. will not occur so much in the proliferation and diversity of tailored artifacts as in the minds of the men and women who will produce them.

The United States by 2020 will achieve a distinct psychological shift from a dependence on visual, uniform, homogeneous thinking, of a left-hemisphere variety, to a multi-faceted configurational mentality which we have attempted to define as audile-tactile, right-hemisphere thinking. In other words, instead of being captured by point-to-point linear attitudes, so helpful to the mathematician and accountant, most Americans will be able to tolerate many different thought systems at once, some based on antagonistic ethnic heritages. Social patterns will have more weight than alphanumeric measurements. But, nevertheless, we cannot look for a balance between the hemispheres right away. Having few ethnical, social, or conscious restraints, America is destined to plunge headlong into right-hemisphere values and attitudes, perhaps abandoning for a time the virtues of precise naming and quantitative ordering, much as some bright teenagers desert their studies for the uncertain joys of covert data-base searches and bootleg videogames. One could make a case that twenty-five years of television viewing has already set the stage for this psychic shift when one considers that the average North American family spends seven and a half hours a day in front of the cathode ray tube, to the neglect of more stimulating activities.

The real meaning of the legend of Narcissus is that he did not fall in love with an image of himself but rather the face of a seeming stranger. Zeus made him gaze into the watery pool which gave back a reflection of someone *like* him but different enough to be fascinating. Not replica but re-presentation. This is precisely what happens when we project our bodily and psychological functions

onto the world outside. We "amputate" them because we cannot gaze too long at a balefully realistic playback of ourselves. To some extent, the function of art is to provide some livable distance.

All media are a reconstruction, a model of some biologic capability speeded up beyond the human ability to perform: the wheel is an extension of the foot, the book is an extension of the eye, clothing an extension of the skin, and electronic circuitry is an extension of the central nervous system. Each medium is brought to the pinnacle of vortical strength, with the power to mesmerize us. When media act together they can so change our consciousness as to create whole new universes of psychic meaning.

That glowing phosphorescent eye sitting altar-like at the end of the living room is no exception. Herbert Krugman, in experiments conducted for General Electric, seems to have been the first man to discover the relationship between television and the alpha state. Picture yourself sitting down for a night's viewing. You have had a day's worth of analytical problems, whether you have been fixing a car or doing actuarial tables. You switch on the set. Almost immediately your left brain slides into a nondominant, neutral state, lulled by the dots flashing sequentially across the screen at one-thirtieth of a second.[2] But the right brain remains alert stimulated by bright, sensuous images, music, and random movement. The right hemisphere may be the seat of emotion; and, if not that, then handily connected to those limbic regions which give forth a tympany of sub-primate responses from below the neo-cortex. Freed from the restraints of the watchdog left, your mind is in a condition to respond to virtually any suggestion, especially of a sensuous or symbolic nature, and you are fair game for the nonrational sell.

The home may very well become more efficient and automated as cable TV, videocassettes, videodiscs, and quadraphonic sound are added to new home construction. For those who need escape, high-density screens will amplify and accentuate the alpha state. For those seeking information, TV linked to the computer might eventually surpass the resources of the Library of Congress. The speed of print data through satellite hookups, such as Associated Press Newscable, could deliver to individual users an overwhelming range of information fashioned, perhaps, to one's professional

needs. The possibility of constant live information would prompt a continual update of background data on key news events. Audiences oriented to a videogame mentality, neglectful of books and newspapers, might over a period of time welcome a capsule style of reporting, which when pushed to its farthest limits reverts to the style of the ideograph.

In the one-way "distributive" mode, television—if it remains in the hands of the white, Anglo-Saxon establishment—could become a buttress blunting the disruptive effects of ethnic diversity. In the two-way, "interactive" mode, individual data-base users could utilize the medium to resist the propagandizing character of national network programming, since it emanates from only two or three sources. In either case, the records kept by cable system owners will no doubt be used to construct profiles of purchasers' habits and opinions; which, in turn, will be sold to merchandisers who will solicit buyers for products.

By the power of this combination of video-related technologies alone, the U.S. economy would be finally shifted from a manufacturing to a marketing society. Most of the telecommunications investment in America is now going into land-bound cable with the object of achieving an 80 percent coverage of U.S. homes by 1990.[3] Cable, whose chief technical ingredient is coaxial lines, is currently devoted to refining and repeating the signals originated by the national diffusion networks (ABC, CBS, and NBC), but its most important function, yet to be fully tapped, lies in its "narrow-cast" two-way quality: that is, its capacity to send signals from the cablehead and, at the same time, receive signals from individual homes and businesses.

When fully realized these interactive abilities can, at least in the beginning, be used to accomplish such things as routine housekeeping chores, security, and teleshopping. At the very least it means more personal freedom for the householder and the chance to work at home. This is another way of saying that the home could become a center point once again in American society, as it was on the frontier. Serial marriage and divorce will produce all manner of extra relatives and half siblings, making the family seat a shelter for the extended clan and a powerful pastiche of shared psychological and economic interests. Add to this the fact that the U.S. population is becoming steadily older on average (over 20

percent), and a new nub-point of conservatism could clearly emerge in future.*

What will happen in the home will become implicit in the workings of the information-service economy. The consumer as producer will take the initiative away from the conglomerate.[4] In the nineteenth century, there appeared a vertical organization of society geared to raw materials, manufacturing, and distribution, laid out geographically with the railroad acting as a sort of connective tissue. Towns and cities—often called company towns—grew up and drew their life's blood from one of those hierarchical vertical activities. Buffalo, New York, was a steel town; Roseburg, Oregon, devoted itself to lumber.

In the information age, however, we shall see whole regions devoted to a balancing combination of industries in the same sense that "Silicon Valley," south of San Francisco, is keyed to all the products of photonics and microelectronics and the Orlando area revolves around the transportation, travel, and tourism complex of Disney World. Industry in the twenty-first century will be horizontally affiliated. The computer, working at the speed of light through a myriad of communication devices, will produce tailor-made products and services for potential buyers who have already presignaled their preference through the database, whether it be a perfectly adjusted insurance/investment program or a dream vacation.

One can easily visualize the development of affiliated corporations dedicated to the national management of finance and insurance, construction, mining, hi-tech manufacturing, agriculture, and utilities. At first, computer hardware will intensify centralism. But as soon as the software is developed which emphasizes the needs of pre-registered clients, the result will be decentralizing. If the personal and operating data of each household could be contained in a data base, the affiliated corporation (with the permission of its clients) could design, build, and control all home utilities, housekeeping records, general payments, and tax filings for millions of people, regardless of location. Freed to pursue other interests and diversions, the client might very well consider such services well worth paying for.

* More precisely, as of 1988, the number of U.S. persons over 55 was 51.8 million (21.3 percent of 245 million), and the number over 65 was 29.8 million (12.2 percent).

Most of the troubled inner cities of the Northeast and Midwest will probably not be able to attract the affiliated service corporations. High taxes, crumbling utilities, cramped living space, and intense crime areas all may be bypassed in favor of suburban and rural areas, in much the same way the Prudential Insurance Company chose to place its axial computer center in Roseland, New Jersey, and Harcourt Brace Jovanovich sited its new corporate headquarters between Tampa, Orlando, and Daytona Beach.

The affiliated corporation (AC) should be a direct product of the current state of signal transmission. Copper is a costly mineral which has, on occasion, been difficult to obtain since World War II. Fiber-optic glass, on the other hand, is made from one of the commonest elements in the universe, silicon; and one pound of fiber-optic strands yields up to eighty times more data (analog and digital) than a pound of coaxial cable.[5] It is uncommonly light and flexible. But, more important, fiber optics can make possible the low-cost and efficient linking of all of the terminal hookups necessary for an up-to-the-second orchestration of sound and visual information (through infrared light)—which cannot currently be done with copper wire, microwave, and coaxial cable. Fiber optics constitute the electronic backbone of the DACS computer center at Disney World, where "all aspects of show performances 'on-stage' throughout Walt Disney World (27,000 acres) are monitored from the opening and closing of theater doors to the singing of bears, birds, and the speeches of pirates and presidents"—and, one might also add, the direction of all lighting, heat, air-conditioning, and garbage disposal.

The AC, in other words, whether public or private, is an electronic "omnium-gatherum" which unlike the products of the machine age is keyed to human rhythms—a reciprocating dialogue with the environment emanating from the central nervous system; an artifact unique to our century. The satellite cum data base gives to such organizations as the Associated Press, Walt E. Disney Enterprises, and Citicorp, a New York bank holding company, the power to adjust all their operations from pole to pole in one-fifth of a second. The major video-related technologies (fiber optics, computers, microwave, and satellite) obliterate distances, to be sure, but on an interactive basis. This computer/data-base power

of simultaneity will cause the literal implosion of some businesses and public services, which is the essence of robotism.

Writing was a device to govern by paper over long distances. Calendars were devised, like clocks, to trace the passage of written and printed messages from one region to another and to centralize the organization chart. Instant control, however, eliminates the middle man. There is, for example, no technical reason why the 40,000-odd financial institutions in North America devoted to banking, securities, and insurance could not be merged into a single institution through electronic means. Horizontally arranged, multi-service ACs could become regional and global, like Diner's Club or American Express, merely through international charter. The ability to organize on a worldwide level at low cost would give some affiliated corporations more power than any single international business or modern state. For instance, Citicorp today (with its 90,000 people in 3000 offices in 90 countries) through the manipulation of whole currencies could, if it chose, bring about the fall of governments.

The mature affiliated corporation will have no irreplaceable administrative locus; it will be structured acoustically with many centers. The Associated Press has ten major computer banks placed in a hub pattern around the United States. If one were to fail, the other banks can be made to share automatically the message load. Accordingly, the AC of the future will assume a spherical character, like the Bell System telephone network. AC managers at teleports in world locations would sit at multiplexing "organs" bringing time, space, and satellite frequencies together as a resonating whole—time and space undivided, in the sense that one cannot divide a musical note.



Global Robotism: The Dissatisfactions

Robotism is also decentralizing. The invention of the alphabet and writing tended to complement the ancient propensity to concentrate, in a sedentary way, power and resources. The scribe had a strategic left-hemisphere position in centralized bureaucracies, well into the twentieth century.

In an electrically configured society all the critical information necessary to manufacture and distribution, from automobiles to computers, would be available to everyone at the same time. Espionage becomes an art form. Culture becomes organized like an electric circuit: each point in the net is as central as the next.

Electronic man loses touch with the concept of a ruling center as well as the restraints of social rules based on interconnection. Hierarchies constantly dissolve and reform. The computer, the satellite, the data base, and the nascent multi-carrier telecommunications corporation will break apart what remains of the old print-oriented ethos by diminishing the number of people in the workplace, destroying what is left of personal privacy, and politically destabilizing entire nations through the wholesale transfer of uncensored information across national borders via countless microwave units and interactive satellites. The twenty-first century will be the age of *Aquarium*, by common consent. Left-hemisphere thinking will atrophy, submerged in acoustic space.

Ecology shifts the "White Man's Burden" onto the shoulders of the "Man-in-the-Street." The meaning of the atomic bomb is that we can no longer fight territorial wars as a sort of solo game-playing, so beloved of the left-hemisphere. The age of information remakes the world in our image. The media extensions of man are the hominization of the planet; it is the second phase of the original creation.

Territorial fights spring from a sense of isolation by interval (the illusion of mechanization), which is a transformation of some aspect of nature, or of our own bodies, into amplified and reconstituted forms. We extend parts of ourselves out into the environment to do some intensely elevated function (i.e., wheel (feet), hammer (fist), knife (teeth-nail), drum (ear), writing (eye)) and then find ways to fight about it. The early ape with a club was a specialist. The first humanoid uttering his first intelligible grunt, or "word," outered himself and set up a dynamic relationship with himself, other creatures, and the world outside his skin. Speech entails competition. It is also a tool to reconstitute nature into working synthetic models, to translate one form into another. Conflict occurs, not because of human inefficiency, but technology moving at incompatible speeds.

The pre-neolithic art of making stone tools moved man out of the process of evolution and into a world of his own making.[1] The hunter became the neolithic planter. Being in one place gave man the opportunity to count the ways into which he could divide himself. Early on, as a pre-literate he outered his whole body into a ship or a hut or rollers (the Incas had no wheels). As a presumptuous literate, having regimented the character of thought (mental dance, nonverbal ESP), he specialized by outering only portions of himself, imitating the sequential mental climate of the phonetic alphabet. He unrolled his uniform sense of wholeness and sectioned himself like a salami. Power came through amplified physical repetition.

Whether maneuvering his coracle, bow and arrow, battle tower, or steam engine, the translation of these media (and his robotic relation to his own inventions) was only partial, the extension of one sense at a time. Nevertheless any medium, by dilating a particular sense to fill the whole field, creates the necessary conditions for hypnosis in that area. The medium becomes an unknowable

force to the user. This explains why all societies are initially numbed by the adoption of any new technology. At no time in man's history has any culture been aware of the effects of its outered media upon its overall associations, not even retrospectively. The Tartar stirrup created the medieval knight as tank; a fact that astonished the successors to the Huns.[2]

As man succeeds in translating his central nervous system into electronic circuitry, he stands on the threshold of outering his consciousness into the computer. Consciousness, as we have discussed in a previous chapter, may be thought of as a projection to the outside of an inner synesthesia, corresponding generally with that ancient definition of common sense.[3] Common sense is that peculiar human power of translating one kind of experience of one sense into all other senses and presenting that result as a unified image of the mind. Erasmus and More said that a unified ratio among the senses was a mark of *ratio*nality.

The computer moving information at a speed somewhat below the barrier of light might end thousands of years of man fragmenting himself. Up to now, the extensions of man have been warring with each other: spear against gun, stagecoach against railroad engine, television against radio, at incompatible speeds. The horizontally organized, multi-service corporation, or something like it, in its use of information as wealth by electronically predicting consumer needs before the first wheel is turned or button pushed in factory or retail outlet, may be returning us to a state of integral awareness.

We are entering the age of implosion after 3000 years of explosion. The electric field of simultaneity gets everybody involved with everyone else. All individuals, their desires and satisfactions, are co-present in the age of communication. But computer banks dissolve the human image. When most data banks come together into a reciprocating whole, our entire Western culture will turn turtle. Visualize an amphibian with its shell inside and its organs outside. Electronic man wears his brain outside his skull and his nervous system on top of his skin. Such a creature is ill-tempered, eschewing overt violence. He is like an exposed spider squatting in a thrumming web, resonating with all other webs. But he is not flesh and blood; he is an item in a data bank, ephemeral, easily forgotten, and resentful of that fact.

Earth in the next century will have its collective consciousness lifted off the planet's surface into a dense electronic symphony where all nations—if they still exist as separate entities—may live in a clutch of spontaneous synesthesia, painfully aware of the triumphs and wounds of one other. "After such knowledge, what forgiveness." Since the electronic age is total and inclusive, atomic warfare in the "global village" cannot be limited.

As new technological man races toward this totality and inclusiveness, he will no longer, as in earlier times, have an experience of nature, as "nature-in-the-wild." He will have lost touch, and by now we should realize that touch is not simply skin pressure but a grasp of all senses at once, a kind of tactility. When we lose nature as a direct experience we lose a balance wheel, the touchstone of natural law. With or without drugs, the mind tends to float free into the dangerous zone of abstractions.

Arnold Toynbee wrote that incompatible societies will always fall into a confrontational situation with each other, that a complex civilization, for example, growing rapidly beside a less-developed, tribally oriented group will rain down a blizzard of psychic suggestions as a counter-irritant which will inevitably result in an explosive reaction. This observation, played in reverse, tells us that the inner-directed person, especially one inflated with an almost Emersonian view of individualism, will be emasculated by the effects of acoustic space because he is not trained to perceive it.

In this century the Third World has increasingly been manipulating the West. "Weaker" societies invade and conquer "stronger" societies not by arms but through infiltration in much the same way the people of the Southern Hemisphere and the countries of the Pacific Rim have been slipping into the United States because the white, Anglo-Saxon majority has been unable to "see" them. Right-hemisphere-oriented people, like the African Blacks, are invisible to those who cannot think in qualitative terms. When the Banana Republics began to destabilize over land reform in the twenties and thirties, the U.S. reaction was predictably lawyer-like and aggressive, a call to the military to make those "greasers" behave.[4]

Like education and industrialism, the military of the West is the product of the homogenizing effects of the phonetic alphabet, King Cadmus's Dragon's Teeth. Occupation to the U.S. Marines was a container to be filled, not a process to be monitored. The people

of Central America absorbed the gringo thrust and blunted it with a lotus-like effectiveness. The multitude has no use for time laid out in intervals, keyed to a demand for results. Only specialists think that way.

The person who gives over his life to electronic services, whether he is merely a participant in a cable system or an information manager, will lose the security that proceeds from specialism. Specialism developed in the Western world as a reaction to the new social order devised by Solon for his fellow Greeks. Henceforth, proclaimed the lawmaker, the Athenians will make goods only for export, leaving the agricultural bias of the Attic Plains to itself. Soon the Greeks added foreign slaves and profits soared. They began to entertain the idea of a job as a repetitious assembly-line method of making goods, which is undoubtedly the source for the Greek word *tekné,* art, or made-by-hand.

The idea of the role was gradually lost sight of—that is, the multiple holding of partial jobs signifying one's authority over a household. The specialist can always be seen to have one salient characteristic: he is quite willing to trade his freedom of action for the security and the stability of a closed system. Odysseus undoubtedly felt the sting of this commitment after returning home to Penelope, climaxing ten years of creative wandering. Toynbee explains that in a culture of active warriors, the lame and the crippled (and the old) become specialists, like Haephaestus, the smith and armorer.

The Russians have never really moved beyond specialism. Russian austerity is founded on the fear of the new media and their capability of transforming social existence. The Russian revolution reached the stage of book culture. The filmmaker Sergei Eisenstein was tolerated but his images generally suspected. Lev Kuleshov began his career as a film editor by making documentaries that seemed like biologic text records. The Russian party line stands pat on the status quo ante 1850 that produced Engels and Marx. Karl Marx never studied or understood causality. He paid no attention to the railway or steamboat.

Present-day Russians strive to live within the nineteenth century of consumer values, allied to the idea that the state ownership of the means of production really has a crucial effect on society. Accepting the possibility that, through electromagnetic means the

mass consumer without owning anything could become the czar of production, seems quite beyond the current crop of party theorists. And beyond the urbs of Moscow and Leningrad, with their tenuous grasp of Western property ideas, lies the rest of the nation: tribal, corporate, and nonvisual.

What may emerge as the most important insight of the twenty-first century is that man was not designed to live at the speed of light. Without the countervailing balance of natural and physical laws, the new video-related media will make man implode upon himself. As he sits in the informational control room, whether at home or at work, receiving data at enormous speeds—imagistic, sound, or tactile—from all areas of the world, the results could be dangerously inflating and schizophrenic. His body will remain in one place but his mind will float out into the electronic void, being everywhere at once in the data bank.

Discarnate man is as weightless as an astronaut but can move much faster. He loses his sense of private identity because electronic perceptions are not related to place. Caught up in the hybrid energy released by video technologies, he will be presented with a chimerical "reality" that involves all his senses at a distended pitch, a condition as addictive as any known drug. The mind, as figure, sinks back into ground and drifts somewhere between dream and fantasy. Dreams have some connection to the real world because they have a frame of actual time and place (usually in real time); fantasy has no such commitment.

At that point, technology is out of control. The Greeks very early lost control of technology when they substituted the idea of the private citizen and written legal codes for the peer wisdom of traditional communities. During what we identify as the Golden Age of Greek literature, Herodotus remarked that his people were "overwhelmed by more troubles than in the twenty preceding generations. . . ." In the Western world we are heading for an inrush of social aims and structures. The group mind will predominate and make us so sensitive to other people's needs and wants that whole regions will be exhausted by the demands of adjustment.

But more deadly than minute and constant calls for change, especially when those affected are unaware of its cause, is the attitude of mind which has persuaded Western man to take on the

duties of a god. *Sputnik* in encircling the planet made it an object of art. That small aluminum ball called forth a view of the earth as something to be programmed. Like the pilot of the space shuttle, man is now captain of spaceship earth, engendering a concept of ecology—of earth, air, fire, and water as an integrated whole. There are no more passengers, only crew. Such a grasp of totality suggests the possibility of control not only of the planet but of change itself. Constant change, for its own sake, threatens everybody. (One of the interesting things about continuously mutating technology is that it is one of the prime sources of inflation.)

In a state of social implosion, induced by information moving at the speed of light, those who are part of information monopolies, like the foreign-exchange analyst or the book editor, will not see change as threatening. But when ordinary people do not know who they are, they get anxious and violent. Many men went to the frontier in the last century to prove themselves. In the border town of the American West, everybody was a nobody until he wrested an identity through taking a risk and pure grit. The frontier was a hardware society which allowed men and women to define themselves by transforming the land.

The electronic society does not do so; it does not have solid goals, objectives, or private identity. In it, man does not so much transform the land as he metamorphosizes himself into abstract information for the convenience of others. Without restraint, he can become boundless, directionless, falling easily into the dark of the mind and the world of primordial intuition. Loss of individualism invites once again the comfort of tribal loyalties.

As the well-developed industrial nations of the Northern Hemisphere keep their population growth down through birth control and move toward a socially implosive situation, the nations of the Third World, particularly of Africa and East Asia, are increasing their populations at an average yearly rate of 2 and 3 percent. In a five-year period (ending in 1980), India added nearly 50 million people. Kenya may double its population in the next twenty years, from approximately 23 million to 45 million.* By the year 2020, when world population is reassessed, the Third World will hold

* Kenya may double its current population by the end of the century according to United Nations sources; by 2025, this nation, which includes a major part of East Africa, may exceed 80 million persons.

over 80 percent of the planet's people and will have run out of land to feed itself.[5]

Mexico will press against the southern border of the United States, weighing in at 100 million souls.[6] Consider what Spanish-speaking U.S. citizens might do politically and economically to keep migration flowing across the Texas-California frontiers, especially if Hispanics strike up informal coalitions with other minorities to redefine the power of federalism. Super regionalisms and separatisms, like the *Parti Quebeçois* in Canada, argue the possibilities of superstates (and the consequent demise of small countries) in order to cope with world population surges and the prospect of mass starvation.

The electronic planetary surround will dramatize daily the plight of the homeless and starving and the objective, quantitative position of literacy will be everywhere under attack. In the last two decades, when the United Nations Educational, Scientific, and Cultural Organization provided free radios throughout Africa and the Middle East, it shook the foundations of reading and writing in these areas. For over 300 years white missionaries had toiled to detribalize whole nations with the Western alphabet. In little more than a generation, radio (and later TV) has brought the audile basis of the tribe once again into high relief.

In Iran and Libya, Western left-hemisphere values have been toppled. The Mullahs have re-established their rule through the power of the crowd, diffusion broadcasting, and audiocassettes. Temple rule is based on time and the habit of engraving in stone. Military bureaucracy depends on paper and courier systems. Video-related technologies compress the sequent into the simultaneous and emphasize the pre-literate group will, re-establishing the tribal chieftain. Computer programmers will become the new Pythagoreans, espousing pattern as the golden mean.

Christopher Lasch demonstrated in *The Culture of Narcissism* (American life in an age of diminishing expectations) that he did not understand the basic mechanism of figure and ground.[7] When the ground moves too fast, a condition endemic to the electronic society, only figure is left. The left-brain oriented individual substitutes the act of going inside himself for identity. He uses his own figure as his ground. Hence the professional actor's vertical and often self-destructive egotism. At the speed of light you become a

narcissist because only the figure of self remains—which explains, as Tom Wolfe has pointed out, why some jet-setters are so involved with themselves. They literally belong to no one community; therefore their community is inside their well-cared-for skins.

Narcissism, as a side effect of acoustic space, is, beside AIDS, the fastest developing social disease of the peoples of the West. Yet, at the same time and certainly by the turn of the century, the Third World will implode upon itself for different reasons: too many people and too little food. When one is concerned about food and shelter for today and tomorrow, it is very difficult to be preoccupied with independent goals or future social choices. The "man-on-horseback" beckons towards Armageddon. The tetrad of the cancer cell reveals, in small, the immediate hereafter of the world: cancer enhances cell reproduction, obsolesces the equilibrium or homeostasis of normal cell production, retrieves primitive cell evolution, and transforms itself into self-consumption. Starvation promotes self-consumption.

In the year 2020, nearly 8 billion people (as against today's 5.5 billion) will crowd the planet;* all but 15 to 20 percent will live in today's undeveloped nations. If the First and Second Worlds (the United States, Europe, Russia, and Japan) wish to avoid a disastrous fight to the finish between the haves and the have-nots, they had better be prepared to provide food and psychic leadership to the entire planet, without regard to national priorities. The new technologic man, hypnotized by his own electronic navel, must become his brother's keeper, in spite of himself.

The role of the shepherd, a continuing archetype in biblical literature, invariably entails a spiritual quest. The wolf prowling ravenously about the flock is God's agent for self-examination. In the near future, our spiritual quest may lead us not, as some have thought, into outer space but into the depths of the sea for additional sources of food and different techniques of survival. But such an exploration of inner space could, at first, take the form of a radical overhaul of educational methods.

Jack Fincher in *Human Intelligence* notes that our school establishment is strongly slanted towards left-hemisphere standards and skills. Under electronic conditions the right hemisphere gets salience and preference for the first time since the advent of the alphabet 2500 years ago. The electric ground, like the multi-dimensional nature of the ocean, makes an environment favorable to the right hemisphere. From the viewpoint of some teaching psychologists, the male preference for dominance would be displaced by the female quality of nurture.

* The United Nations estimate of world popualtion in April 1987: 5.5 billion; in approximately the year 2020 that figure should rise to 7.8 billion.

From babyhood, education might be geared to the biologic developmental stages of the mind. Early testing could determine whether a person learns best in a visual or acoustic mode. At their own speed, boys and girls could be taught such subjects as English, physics, math, and chemistry in either left- or right-hemisphere terms. The opposite case prevailed when mechanical and industrial man created environments of lineal services and qualified markets. Electronic man creates environments that are simultaneous, open-ended, and acoustic.

Paradoxically, electronic man is re-creating the conditions of the Orient and the Third World as the norm for our new world. Instant readjustment to surrounding, or robotism, cannot be avoided. The new passion for Zen and the *Tao of Physics* and ESP has an electronic base which is irresistible, because unconscious. Our left-hemisphere educational establishment, embosomed in the Euclidean architecture of Walter Gropius and Mies Van de Rohe, is dedicated to achieving quantitative goals. The new right-hemisphere society (coming to the West) prefers artistic role-playing and an indulgent enjoyment of the quality of life rather than quantity. The new education will have no goals whatsoever.

Governments need to know that electronic services, especially television, eliminate or dissolve representative government. TV ends representation at a distance and involves one in the immediate confrontation of an image. The successful image will be charismatic, meaning that it represents a great many admirable types. (President Carter was Huck Finn in the White House.) The other side of the image is that it tends to become fantasy (discontinuous "flash") under the discarnate conditions of TV-viewing, that is, the audience wishing to be there floating in the electronic void rather than being fixed at home.[8] For the new popular image, of which Reagan is an exemplar, there can be no relevance in parties and policies but only a war of icons or images. Coupled with the cable-based two-way mircrocomputer, the electronic referendum

becomes a species of home rule. No congressman or provincial representative will be able to function without it.

In a word, the difference between the current TV generation and the pre-TV population as precursor of the new age is basically the difference between fantasy and dreams. The fantasy TV generation is not seeking deferred or delayed rewards. The dream generation, on the other hand, which included the radio and movie segments of that population, had dreams and goals based on the star system and the ideals that went with it. Women could model themselves on Greer Garson, and girls, like Judy Garland, could sing to Mr. Gable that "you made me love you." There are no stars, however, in TV, only "television personalities."

Since the basis of natural law is unavailable to the TV generation, its only recourse is to supernatural law as a means of coherence and meaning. The Beatles seek the gurus, and their groupies drift into Hare Krishna. For these reasons, with the fast developing physical plight of Third World as a ground, we appear to be on the threshold of a new religious age—the age of *Aquarium*. But before this all-involving age reaches its apotheosis, four major video-related technologies (computer, satellite, data base, and the horizontally organized, multi-carrier corporation) will break apart what remains of the old phonetically literate society by causing massive unemployment in the industrial nations, a destruction of all privacy, and a planetary disequilibrium keyed to continent-wide propaganda skirmishes conducted through the new-found utility of interactive satellites.

A satellite placed in orbit at 22,300 miles above the earth can situate a nonjamable "footprint" over thousands of square miles, with a clarity long-distance radio could never achieve. When one billion people can be privy to a pope's investiture through world television, one can be certain the prayer mat is about to replace the Cadillac with a new psychic awareness.

A tetrad, as we have said before, is simply an intuitive tool based upon principles very similar to Heraclitean dynamics involving the reconciliation of opposites. The tetrad demonstrates that within each of man's inventions (extensions of himself) left- and right-hemisphere modes of thought struggle for dominance and, in the speed of the electronic age, reveal themselves instantly. A tetradic examination of the four video-related mediums cited above

shows their nonexpansive, implosive character leading to total involvement as compared with the expansive, splintering character of artifacts from the mechanical or industrial age.

The computer is the first component of that hybrid of video-related technologies which will move us toward a world consciousness.[9] It steps up the velocity of logical sequential calculations to the speed of light, reducing numbers to body count by touch. When pushed to its limits, the product of the computer reverses into simultaneous pattern recognition (acoustic space), eroding or bypassing mechanical processes in all sequential operations. It brings back the Pythagorean occult embodied in the idea that "numbers are all"; and at the same time it dissolves hierarchy in favor of decentralization. Any business corporation requiring the use of computers for communication and record-keeping will have no other alternative but to decentralize. When applied to new forms of electronic-messaging, such as teletext and videotext, it quickly converts sequential alphanumeric texts into multi-level signs and aphorisms, encouraging ideographic summation, like hieroglyphics (see Fig. 8.1).

Computers are designed for simple quantitative speedup, that is, to do the repetitive reading, writing, adding, multiplying, and dividing that we all get bored with—a kind of mind-numbing that frequently engenders errors. A computer never gets bored; it thrives on monotony. It doesn't make mistakes. (The people who instruct it make mistakes.) It can get "sick" from time to time and require mechanical rehabilitation. But, in general, the computer fosters accuracy and consistency. These qualities are best demonstrated in record-keeping and data accumulation. And it is exactly in these functions where the effects of the computer on humans can be perceived.

First of all, it is important to understand that the workplace is the chief living area of most Canadians and Americans. We spend more time there than at home. The timetable and the goals of the workplace, whether we are talking about banking, car assembly, office equipment manufacturing, warehousing, or the making of foodstuffs, often overwhelm the priorities of the home. Indeed, the people we work with at times have more emotional impact on us than our own families, because in the workplace, like the frontiersmen of old, we fight our private singular battle for survival. That

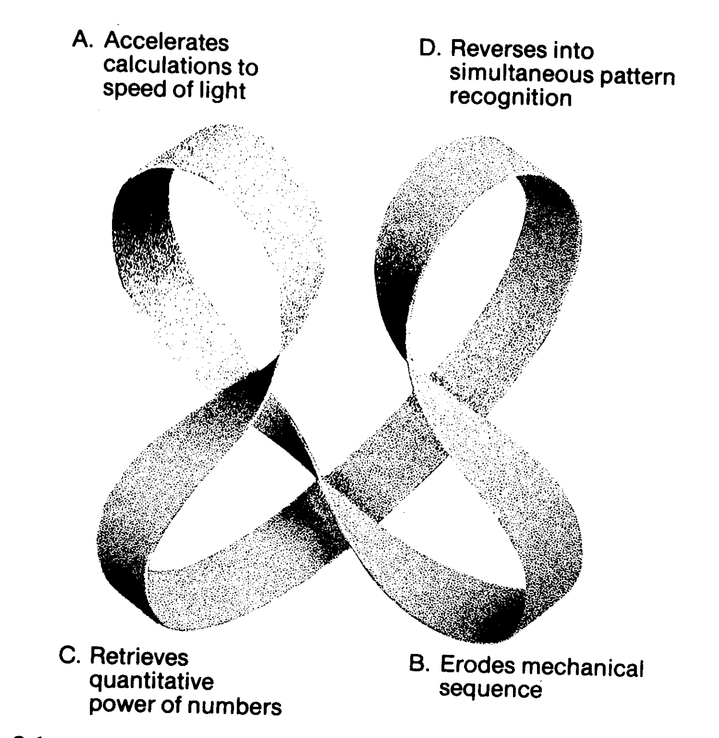


Fig. 8.1.

battle requires us to have allies, a few trusted friends, who become necessary for information and support. The day-to-day interaction among secretaries, clerks, workers and managers, the social life, if you will, among people in the workplace, is the matrix against which the work of the business is done.

Computers will, in the long run, dramatically alter the social environment of the workplace as we know it. There is no point trying to avoid what is coming, because to a great extent that structure of change is already here. Let us, for example, examine the nature of that change in most "front office" situations, that is, organizational units which collect and analyze information for decision-making purposes. Richard Crump, a management analyst

for Northern Bell, developed a paradigm for analyzing most workplace conformations. He says that information workplaces have three kinds of people: the processors, the concentrators, and the interactives.

A processor generally does nothing with data material; he or she simply translates it from one medium to another. For instance, a clerk in the stock exchange could spend all day transporting numbers and symbols from phone to paper or paper to CRT. The essential thing is that the processor does not add or subtract from the total data available.

The concentrator collects, prepares, and partially arranges data for someone else's use. It is usually done for a particular purpose. The meteorologist will collect temperature and barometer readings in order to outline high and low areas on the weather map. Monthly sales figures will be routinely compiled for comparison at a later date. Subject matter varies. The concentrator is usually someone who can work alone without reference to other people, needing, however, occasional direction.

The interactive type is a manager—the social center of the office situation, representing the organization to outsiders and regulating the work force according to specific objectives. Essentially, he or she decides how to manufacture the raw data into the finished product of information. The interactive person is charged always with the responsibility of collecting data, passing it through a series of planned actions to produce a set of results. From the quantitative, as it were, to the qualitative.

Why is all this necessary? Those who run any business, whether it be a university or a manufacturing plant, need information, as opposed to raw data, to control the operation. They need to keep track of what is going on between the internal life of the organization and the outside world—essentially to keep track of the number and kinds of transactions so that they know what they are accomplishing and can further assess what to do. Transactional records have to be assembled in one place (data base) and related to current business. Current business, to be comprehensible, has to be related to the past so that statistical materials can be assembled for accounting, billing, customer advice, and periodic reports, both to management and government. The problem was the same for the high priests in charge of the Babylonian granaries as it is

for us today. Only the tools have changed: from abacus to electronic calculator, so to speak.

The average business computer largely mimics the functions of the processor and the concentrator. It collects raw data from the data base, sends it through a series of planned actions via a program, and produces information which, in this instance, can be defined as "news you can use." The program is a list of instructions devised by the interactive person; a "recipe" to produce timely facts needed for review and control.[10] In the future, the orchestration of such facts will become more important than ever before. As facts move at the speed of light, the techniques of capturing them analytically, in time and space, will be the special province of information specialists who will harmonize machines more than people. In effect, the processors and concentrators will be replaced by electronic circuits.

It won't happen right away; the transition will be gradual, yet inexorable. Perhaps a better way to understand this process is to realize that the innards of the data-processing computer, which has essentially not changed in principle in the last thirty-six years, is a simulation of general office behavior. Parenthetically, what really has changed is the speed of computation, from a thousandth of a second to a trillionth of a second. The comparison is broad, but nevertheless clear.

In most office functions, there are people who spend a good part of their working day taking or checking orders; once checked these materials are often passed on to other departments (the processors). There is another group which assembles current transactional data for updating and billing purposes, past and present (the concentrators). All these functions are controlled by a chief clerk usually under an office manager. In every computer, which performs data-processing tasks and has a logic capability, the job of the processor is replaced by input and output elements. The job of the concentrator is taken by memory and data storage. The agency of the chief clerk is taken by the central processing unit. The really operative person is the programmer-manager or systems analyst who devises the original electronic directions to synchronize the computer "office." In short, the entire operation has been miniaturized, speeded up, and placed under the direction of one mind instead of several.[11]

Therein lies the problem. One person, one might imagine, sitting before a terminal, mesmerized by the product of the human mind, believing perhaps that the brain is as "perfect" as the machine. The computer is a massive enlargement of only one level of reasoning—what philosophers are prone to identify as efficient cause (cause and effect). It deals with only "yes" and "no," the essence of the excluded middle, the digital form. It allows no consideration of opposites of equal power. The plan of the computer allows no other form of reasoning and cannot ask questions about the antecedents of its own programming. Hence, the programmer-manager is in constant danger of becoming a self-mesmerized robot. But more than that are the warnings of social isolation. Nathaniel Hawthorne spent a lifetime telling us how perilous it is to have no other spiritual or moral measure but our own.

The very nature of the computer will push logical (mathematical) maturity to the point of breakdown. Most logical sequential calculations can easily be driven to the speed of light. As this process evolves, it will bring back and accentuate an ancient preoccupation with the mystical quality of numbers in a sensuous tactile mode.[12] At this stage of greatest intensity of development, there will be an unanticipated reversal: the simultaneous will emerge from the sequential, the mythic from the historic, acoustic from visual space. The old ground rules of point-to-point logic will break down. And holism will then emerge as a dominant form of thinking, governed by a considerably smaller group of management elite.

In the same way that no telephonic engineer can conceive of an entire coast-to-coast network in anything but a 360-degree dimension, software—in the computer—will in itself become an art form, with individual highly recognizable human signatures. Human signatures, however, can be easily counterfeited. Hence, one of the elements of holistic thinking in the future will be the need to encrypt whole data networks and satellite systems to protect key areas of information, without which corporations and governments could not function.[13] A small elite will become the guardian at the temple gate.

The data base is an electronic library capable of massive storage and instant accessibility. The storage capacity of the first electronic computer, ENIAC, can now be placed on a microchip. The

data bank, coupled with the computer and serviced by a variety of electric transmission networks, can be made to record (for simultaneous retrieval) all one's financial, social, educational, and personal transactions from birth. Major data bases are abuilding all over the Western world, but to date none has reached the mature dimensions (with the possible exception of those of the Internal Revenue Service and the Federal Bureau of Investigation) of the banking industry's Electronic Funds Transfer System (EFTS).

EFTS, therefore, may be considered the working prototype of all such planetary data bases, having already reached international size with few rivals either in government or business.[14] We have chosen to illustrate the internal mechanics of the data base with EFTS because no other system is so intensively updated minute by minute. Functionally, as to structure, EFTS erodes the use of barter and paper money through the means of electronically machine-readable transactions, often without the benefit of separate paper verification. The bank, or a consortium of banks, becomes the sole arbiter of your credit reputation. Accumulated information in credit data banks wipes out one's personal privacy and makes cash money more difficult to use than credit itself. Public social desirability is thus reduced to creditworthiness. Until all financial data banks can be linked, no record of total individual indebtedness will be kept; but, the very act of keeping several credit (card) procedures at work keeps an inflationary pressure on the individual and the system (see Fig. 8.2).

The banking industry in both Canada and the United States has been involved in an implosive speedup during the last sixty years as it has passed from mechanical automation to electronic internal accounting procedures. In most large cities, checks can be debited and posted to other branches, indeed, other banks within a twenty-four-hour period. Even though the collection process is somewhat slower in the U.S. than in Canada because of state laws and a more fragmented pattern of banking, it now involves trillions of dollars each day, not merely millions.[15] However, unless the hardware can keep up with general bank business, which shows every sign of increasing in transactional volume, and unless it can instantly present a picture of the depositor's general credit/debit situation involving all his assets, creditworthiness, per se, will become the only index to a person's financial status.

Data Base (EFTS)

A. Creates cashless society

D. Reverses into credit-worthiness as pure status

C. Retrieves credit overload

B. Obsolesces personal privacy

Fig. 8.2.

Since no one will really know the actual adjusted total of anyone else's assets, unless it is attested to by bankruptcy proceedings, credit will always be available at the speed of light. One way of understanding this state of affairs is to sketch a future scenario. The year is 1994. You are in a hotel room in New York City. During the night a thief has gained access to your room. He watches your sleeping face as his hands race over your possessions. Then, he locates what he has been looking for—your bank credit cards. Silently, he taps the exit code on the door and lets himself out. Has he taken your cards? No. He has simply copied the account numbers on each of your cards by re-encoding the numbers magnetically onto plastic cards of his own. Within a few minutes

he is in the back seat of an automobile, with a portable minicomputer, devising several plastic cards exactly the same size and shape as the ones he found in your luggage.

Later, he travels about the city locating various automatic teller machines (ATMs) which are linked to the various banks (and near banks) with which you do business. At each ATM, he rechecks a list of "broken" personal identification code combinations and punches a few buttons. First he queries the bank computer as to your bank account level and credit limit. Then, the thief electronically withdraws all but fifty dollars (or the daily withdrawal limit). Between $300 and $1000 might glide into his hands from each of your bank accounts. A few days later, when you check out of your hotel, you discover that all your checks have bounced.

As a recent television commercial (1985) asked—what will you do? Fortunately you have kept up your credit card insurance. You dial a Bell Systems 800 number and receive instructions. The person (or computer) at the other end of the connection asks for your bank credit numbers and your current address. You receive an emergency loan for hotel and travel expenses, complete with cash credits. He then issues you a pseudonym, for check-cashing purposes, to be used for the next sixty days while your home bank computer checks with the data-processing centers of all its correspondent banks in the U.S., Canada, and overseas to be sure your account is readjusted for use under your original name. (Of course, it might be better to legally change your name since every sales outlet for goods and services you have been using locally and regionally has received an automatic order shutting off your credit.)

But you have been lucky. Your credit history is long and generally satisfactory and that will ensure that your credit rehabilitation will be relatively short. What is significant about this episode is not that you are cash broke but that you are creditworthy. In other words, unless you are demonstrably without assets, the banks would rather continue lending you money rather than severely limiting your access to credit.[16] The continual rim-spin of the transaction rate will eventually become more important than how much an individual depositor is worth. One of the most identifiable characteristics of the cashless society is that credit is always more important than cash money.

The nexus point in the transactional or payments system is when one passes from the check to the electronic fund transfer, from the left to the right hemisphere, as it were. Despite increased efficiency, it is rarely possible to clear a paper check locally or regionally in less than twenty-four hours. But the computer can debit or credit an amount instantaneously—on an international level, if necessary.[17] That also means that a credit rating can be validated at the same speed. Thus, the electronic passage of credit and money information has created a new service environment.

This new service environment has been constructed from a hybrid merger of the digital computer, automated accounting procedures, and high-speed data transmission on "dedicated" telephone networks. It is broadly called electronic fund transfer (EFT) which one observer has described as "computerized facilities to transfer money electronically between customers' bank accounts." Legal caveats aside, it is really the creation of a super bank through the electric linking of literally hundreds of local and regional data sources to provide the entire Western world a view of your social and economic standing—if your bank transaction is large enough and across state and provincial borders.[18]

Several reasons have been advanced as to why we need a worldwide electronic fund transfer system. The number of actual transactions, whether cash, check, or wire, has become so high that one needs the computer and instantaneous data relay simply to stay ahead. Furthermore, written and printed checks are becoming too expensive to handle—fifty to eighty cents per piece of paper. We have to find a way to reduce the debit float as the number of transactions increases; sometimes in the U.S. it takes three or four days to collect funds as a check passes over state lines and through three or four separate banks. Some experts say it is not so much the transaction volume as the actual value of monetary transfers that is important. Some corporate transfers from several different bank accounts at once can involve hundreds of thousands of dollars. Quick clearance is necessary for safety. Each year in the U.S., corporations transfer among themselves over forty-four trillion dollars; much of this amount is done via electronic transfer.

As the transaction rate increases, fueled by speed-of-light transfer, then information about people's finances will be exchanged at the same pace. At present most banking is done at the branch

level. In many major North American cities, however, it is also being done at gas stations, supermarkets, drug stores, and department stores. In other words, a computer terminal is provided at point of sale (POS) and checks are cashed or deposits made by direct connection to a data base, weekends and weekdays on a twenty-four-hour-a-day basis. Within a short time, POS banking will become more common than the teller's cage. And credit via POS will become the major support of all retailing—with the data base decentralized, distributed across all the POS affiliates.

Every merchant has one basic problem; he has to sell goods and services fast enough to achieve a profit in any one sales period. The longer things stay on the shelf, the more expensive they become to the retailer. He can develop sales strategies, such as the "loss leader." He can advertise. The most potent tactic is to offer easy credit. Easy credit is useful as long as the retailer can manage to keep down "no-pay" and fraud losses. To protect himself, he has to maintain a credit assessment operation. Many big sales organizations can afford to have credit departments; most of us are familiar with the fuel company and chain store credit cards. But the small retailer finds credit investigations onerous and expensive. It is at this point that the local and regional banks step in. EFTS has made it possible for the local and regional banks to become the prime credit investigators for all small and medium-sized businesses in a particular geographic area. The instrument which enables the banks to get into credit rating on a large scale is the mainframe computer which can provide instant information not only to the branches but to POS affiliates.

The advantages are two-fold. By building up credit histories on large numbers of potential customers, often from old Credit Bureau files, bank data centers are able to provide useful updated information by phone call. Secondly, the bank, for a fee to retailer and customer, can take the risk out of credit extension. The merchant, therefore, is not obliged to retain his old credit files. Meanwhile, the bank can make up to 21 percent per year on the floating credit balance of the customer. Since most people get paid on Thursday or Friday, the small businessman needs the instant credit line to keep the store open on Monday, Tuesday, and Wednesday. Presumably the ATM will take care of Saturday and Sunday.

The lesson in this arrangement is that for all active purposes the

bank becomes the chief arbiter of credit. Since the bank's internal accounting procedures rarely combine accounts on consumer lending and savings nor demand deposit in one centralized file, the data center does not know the day-to-day difference between the customer's overall expenditures and his assets. What it does know is his credit limit, which is roughly based on his transaction record. Each bank the customer deals with, on an independent basis, could provide him with an individual credit limit which may or may not be known to other creditors. And with each individual bank deposit, one might be eligible for a credit card. The opportunities for overextension are limitless.

We now, of course, come to the issue of privacy. Private identity which was tied to a specific time and place is already gone; that is, a definition of self which was achieved in a small community where everybody knew everyone else—the world, as it were, of the nineteenth-century banker. That world began to disappear with the advent of the telegraph.

The kind of privacy we are talking about revolves around the particular information which you can presently hide from a credit investigator. The trade-off for instant credit is no privacy of any kind. Furthermore, the accent on cashless transactions as the transaction rate speeds up will force a great administrative stress on credit investigation. "Trust" will be based on a continual need to update personal information on assets and whereabouts. Eventually, the sheer rate of transactions will force the merger of various EFT credit systems, and this arrangement will encourage personal data trading. High-speed data trading will produce data banks on a national level, rivaling the data bank of the Internal Revenue Service.

The effect will be to decentralize totally the data base. The larger the data-base mosaic, the more difficult, practically speaking, it will be to change bank and branch numbers. At this juncture, a very important result also begins to appear. The user of that credit data base, wherever he is in the world, will have the illusion of centralization as he asks the computer for specific information; but in actuality, he, as well as the data, will be everywhere at once, in the "center" of the system. Time and place in relation to the person will be truly relative.

Once data have reached this state, it is virtually impossible to

protect. Anyone with a minimum of expertise can obtain the information. Armed with your account number, outside investigators can now find out your bank balance as easily as a criminal. If they were to acquire dual access codes, maintained by many banks in printed form, they could conduct more sophisticated probes on account balance, available credit, outstanding balance on revolving credit, interest totals, deposit and withdrawal dates, etc.

Credit information for many years has been a tribal business but we have never been totally comfortable with disclosure. The future holds for us a corporate man who will accept the goldfish bowl as a natural habitat—having recognized that electronic espionage has already become an art form.

In that rapidly approaching future, what about the person who has not role-played well enough to attain continual creditworthiness? He will then, as he is now, be a non-person. (And as we all know, non-persons pay cash.) Yet, the definition of status will tend to harden as the EFT payments pattern takes over smaller and smaller transactions so that the debit card will be used for virtually all those payments now assigned to cash. Those who can only pay cash may be looked on as poor credit risks and, consequently, may have difficulty obtaining employment. They will have suffered in effect a high-velocity loss of identity by being tied to hardware in an essentially software environment.

The satellite will, as that specific science matures, complete the process of disengaging man physically and psychically from the earth's surface. Television is figure without ground. A person appearing on regional or national TV is automatically disconnected from his friends, his neighborhood, from the very lifestyle that is his peculiar hallmark. Contrary to his own perceptions, he becomes larger than life and alienated from himself. The same effect occurs with politicians and entertainment personalities, only it is amplified millions of times through repetition. Their personal image becomes frozen into iconic shape. Being a public figure is becoming an archetype, in the same sense that a charismatic figure reminds you of everyone else.

The computer will create large amounts of leisure time for the employed. It will also create for the unemployed on extended welfare time to participate in electronic politics. If the unemployed are also ethnic regionalists, the satellite will body forth new tribal

separatists who will make Yasser Arafat seem tame by comparison. In the same way that the Baader-Meinhof Gang was composed of disaffected, unemployed university graduates, every separatist group of the future will have an educated—and therefore skilled—terrorist fringe. Having no fixed place in society, terrorists are discarnate; they have trouble recognizing reality. TV, as a maker of fantasy, reinforces that feeling of disembodiment. A terrorist will kill you to see if you are real. The satellite will distribute terrorist paranoia around the world in living color to match each acceleratingly disruptive event.

Satellites began in 1957 as mere reflecting mechanisms. Today they are radio relays for high-frequency microwaves.[19] Tomorrow satellites will grow beyond the cargo-carrying capacities of the space shuttle and become worlds unto themselves, capable of carrying on high-speed dialogues with earth-based telecommunications machines in excess of anything human beings may understand. The satellite string, or cluster, once in place and safeguarded from sudden disruption, could become a force for decentralization in human affairs which might weaken the written word to the point of dissolution. The satellite surround could replace language as a cultural matrix, using images only as a lingua franca (see Fig. 8.3). What might the satellite surround look like in 1999?

Let us imagine a space shuttle hangs in orbit hundreds of miles above the earth. Its nose is directed toward the stars. Its tail pipes point at an angle toward the mottled blue and brown surface of the planet. An articulated metal arm projects at an angle from the cargo bay. Astronauts are placing satellite parts outside the vehicle. When assembled, and space-taxied into geosynchronous track, the satellite will be enormous, fourteen feet wide and weighing 4000 pounds.[20] Fortunately, space shuttles were enlarged and refitted in the middle 1980s to accommodate heavier loads at higher altitudes; if not, COMSAT officials would have used an advanced model of the Saturn V to send it into geosynchronous orbit, 22,300 miles high.

The time had arrived for the super-satellite with its own power, navigation system, and heavily shielded sensors.[21] Several months earlier, a stripped-down version of a space shuttle orbiter had been on a different mission. The sky had become full of space junk, creating a miasma of radiation interference. This orbiter

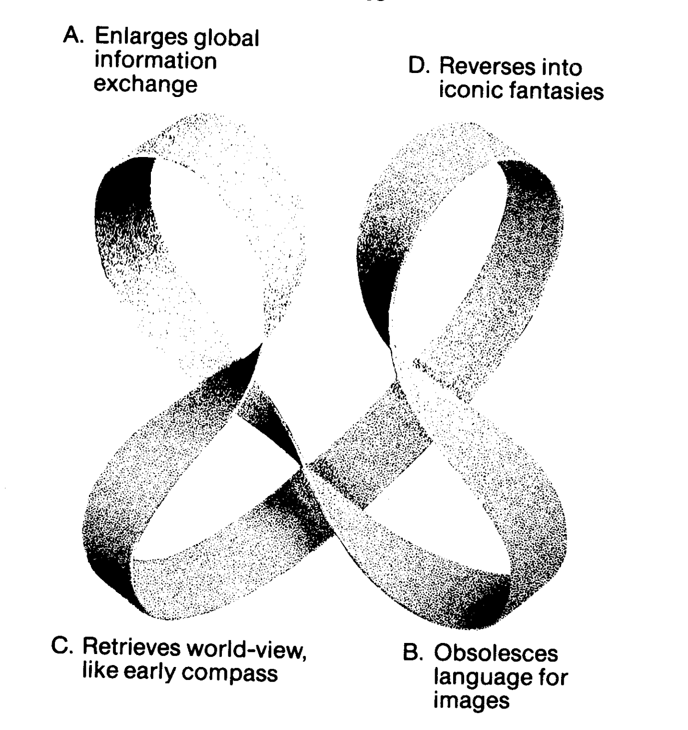


Fig. 8.3.

carried a single, extremely powerful laser cannon; it destroyed earlier U.S. satellites and foreign space machines in order to create a corridor of clear channels for the super-satellites. Gone would be the "model-T" nuclear reactors and vehicles whose useful life had been only a few years due to high relay failure.

Some of the older satellites had been retrieved, but the remaining machines were blinded or bumped out of orbit to go sailing toward the sun. No mistake about it, this was a hazardous mission because those nations whose satellites were removed were irritated to the point of war. But all concerned recognized that the radio spectrum had been placed in jeopardy by satellites which had drifted into irregular orbit, at the equator.[22]

How did this state of affairs come about? To a certain extent, the space jam was a failure of international regulation. The French, the Germans, the Japanese, acting in private consortiums and selling to the highest bidder, had made it relatively easy for small countries to go into near space. (No one, at any of the space conferences, would agree, for example, on a legal definition of near space.) People all over the world could afford one-meter receiving discs when NHK planar circuits were mass-produced. The Soviet Union finally figured out a way to reproduce computer chip designs it had stolen from the U.S. and made this breakthrough available to most of the Third World countries as a military-diplomatic ploy.

In the United States, the 4/6 gigahertz (GHZ) channels had been selected for the first commercial satellites and soon sporadic episodes of interference occurred amongst earthbound microwave links. One space engineer had conjectured that radio interference really began in earnest when a 4/6 GHZ frequency was chosen by Western countries as an uplink-downlink between earth stations and satellites in an effort to standardize transmissions inside the burgeoning AT&T global satellite network. As satellite communications moved into the late 1980s, lower frequencies around the planet, particularly in mega-metropolises, began to congest. Even though one may regard it as only temporary, land and sea links became overloaded and pressure began to build for bigger, more complex satellites.[23] The bigger the satellite, the less expensive earth stations became. Mass message transmission was literally being lifted off the earth's surface to form a dense electronic skein about the earth.

In the 1990s huge, powerful satellites placed about the planet's girth had more power, more transponders, and operated in higher bandwidths. A much more complex relationship had developed between multiplexing equipment and the number of transponders in use. Back in the late 1970s, commercial earth stations were often massive, having 100-foot dishes and liquid helium–cooled electronics. Now in 1999 transceivers are automatic, small, finely tuned, and portable. Some antennae are no larger than thirty-two inches. The average householder has one attached to his house. The electronic Tower of Babel begins to hum more rapidly.

But let us pause for a moment. Where is this speedup in tech-

nology leading? How will people be affected psychologically? First of all, going back to our original analysis of the satellite; it has one prime characteristic—it decentralizes the user, like the telegraph and the telephone. The satellite turns the user into discarnate information. Once placed in relation to the computer/transponder, the user is everywhere at once. You are everywhere and so is everybody else using the system. What is really new about the satellite is that it intensifies the process of being everywhere at once. One can appear simultaneously at every terminal access point on earth or in outer space. This condition poses an almost insuperable problem for the intelligence operative: how can one spy on anyone who is everywhere at once, who could originate anywhere in the net system and change his "location" faster than he can be traced (like Max Headroom)?

The nature of the satellite surround is that it has no center and no margin. "Centers" exist everywhere. This is the way the European understood the character of reality and culture in pre-Renaissance times; no national borders, simply centers of thought and influence; cities which were haunts of being, of ideas—the universe of Duns Scotus and eventually Erasmus where nationalism did not as yet exist. In the age of the super-satellite, large numbers of people will be unable to think merely of regional monopolies of information. Satellites will be able to "talk" to each other and total coverage will lead to total, low-cost communication. Slow information movement will be possible only under the greatest restrictions; espionage will, therefore, begin to disappear.

More and more people will enter the market of information exchange, lose their private identities in the process, but emerge with the ability to interact with any person on the face of the globe. Mass, spontaneous electronic referendums will sweep across continents. The concept of nationalism will fade and regional governments will fall as the political implications of spaceship earth create a world government. The satellite will be used as a prime instrument in a world propaganda war for the hearts and minds of men. The last part of this century will see a war of icons not bombs, a conflict governed by impulse, already begun for us by Roosevelt, Churchill, and Stalin at Yalta.

In the days before the printing press, when the oral tradition still ruled, the values of the medieval world proclaimed that

resonance and music were the basis of social order. Then came the Renaissance man and the dogma of *vertu*, the ambivalent Iago espousing competitiveness as a new tempo. The ever-thickening satellite surround will reverse that 400-year development. The shift to individual self-interest and private goals will be played backwards.

The multi-carrier media corporation has the peculiar ability to be a media orchestrator, to link all video-related technologies, whether satellite, earth station, microwave, data base, or computer, into a resonating whole. It is, by its very nature, an affiliated organization, moving any kind of message unit (image, data, or voice) in real time *and* computer time on a speed-of-light network basis.

Because of the diversity and availability of terminal equipment, a number of businesses have joined the older pioneers, AT&T, ITT, and GTE, in the setting up of regional networking. But because of its earlier work with the military and COMSAT, only one telecommunications corporation currently has all the elements to set up global networking, and that is American Telephone and Telegraph (AT&T). AT&T, in cooperation with the new Bell Systems, has a fully developed research arm, Bell Labs, a worldwide manufacturing facility, Western Electric, and free access to all telecommunication links both at home and overseas. Having divested itself of twenty-two operating telephone companies in the U.S. it now has the capital and the investment ability to move worldwide. The management decisions made by AT&T executives in the next fifty years, in association with the Bell Systems (especially AT&T's Long Lines Division), will determine the scope, effectiveness, and size of the first phase of true global networking.[24]

The wired society epitomized historically by telegraph and telephone links has, since the early 1900s, been slowly encapsulated by a wireless canopy of long-distance radio, microwave, and satellite. Coaxial cable has been obsolesced. Open wireless transmission, being truly acoustic, is a group voice. As the satellite surround finally locks into place, software will dictate a shift from left hemisphere to right hemisphere, from the visual to the acoustic—the latter having the prime quality of the interactive mode. In world affairs, decentralization will highlight diversity and fragmentation. But, at the same time, the speed of transmission will

Global Media Networking

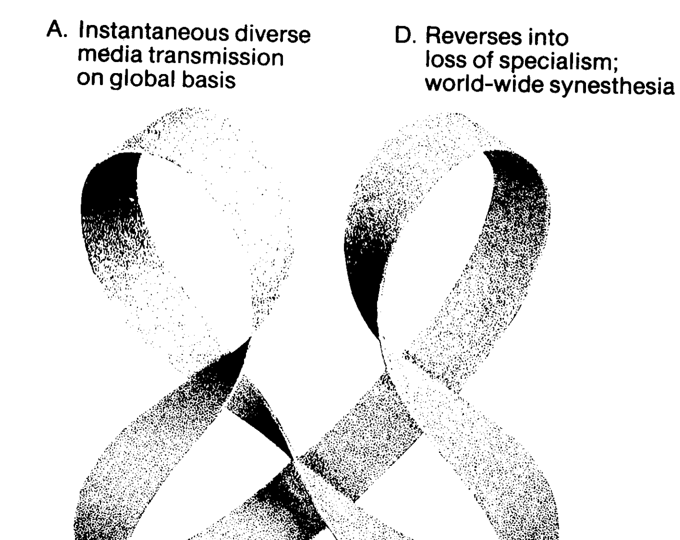


Fig. 8.4.

inhibit the human ability to decode. As a result, specialism will yield to corporate role-playing on a mass scale (see Fig. 8.4).

Most large corporate organizations have little sense of their social personality. The people at the top who control them only perceive their vastness through numbers; the quantitative not the qualitative. The operative language of most corporate organizations in the Western world is articulated in balance-sheet terms and rarely is the human factor considered. But it is a mistake to expect chief executive officers to act solely in humane ways because the stability of the organization is usually expressed in economic counters if it is a profit-making venture. Yet, it is surprising how an analogy of microcosm/macrocosm can be drawn between

the single human person and the corporate organization as a whole. The commercial corporate organization is, after all, a broad extension of the human mind; it develops controlling structures to organize human behavior to produce an economic benefit.

Its activities are analogous, in general, to the interdependent relationship of the left and right hemispheres of the brain.[25] The line functions of a company are like the left hemisphere, concerned with verbal-speech frames of thought which produce quantitative closed-system measurements of the internal and external relationships of the corporate entity. The right hemisphere is concerned with social intelligence which cannot be logically formulated, e.g., the spatial, the musical, the artistic, and the symbolic. The right deals in simultaneous comprehension and the perception of abstract patterns, information frequently provided by staff studies as a preliminary to publicity and advertising campaigns.

Recent split-brain medical research has produced an updated view of the cortex which may have revolutionary consequences for the governance of human society. We have discovered in the last few years that the acoustic dimension, the world of the simultaneous (since we hear from all directions at once), is a sphere whose center is everywhere and whose margin is nowhere. The acoustic world belongs to the right hemisphere of the brain and the left hemisphere is visual—a world of linearity, connectiveness, logic, rationality, analysis, classification, and so on. What is imperative for all of us to know is that at the present time, and for some decades, we have been living in a right-hemisphere world where the major environment in which all Americans and Canadians live is one of instantaneous information. Hence, the right hemisphere of the brain has been covertly present as a ground in all our human relationships; it has been for several generations.

One way of looking at it would be to say that life in the nineteenth century was permeated by the mechanical, the left hemisphere, but that life in the twentieth century, since the advent of electricity, has gradually taken on the coloration of the right. And most people do not know it. In fact, most corporate executives do not know it except, perhaps (and that is a big "perhaps"), those in the business of manipulating electronic technologies.

One American organization, including its Canadian counterpart, does show some cognitive glimmers of its place in the social

and psychic fabric: AT&T and the newly divested Bell Systems. A cursory examination of AT&T's public relations publication over the last twenty years shows a growing awareness of the impact of its services on the population at large, for the most part expressed in terms of what would happen if the telephone were precipitously removed. Yet the internal publications of the AT&T company are still doggedly left hemisphere—"don't use the phone, put it in writing." Many Bell Systems operating managers, engineers, and production men seem stonily unaware that they are functioning within an acoustic "miracle," peculiar to a society suffering from a lingering cog-and-sprocket mentality.[26]

The original Bell Systems was from the beginning a right-hemisphere world. When Theodore Vail, the first president, suddenly grasped the positive effects of governmental regulation, he created a structural idea which over a hundred years allowed Bell to grow into a closed, self-sufficient, self-contained unit. It has been holistic in the purest sense. For many years it has made, serviced, and used its own equipment; its profits, by agreement with the government, were primarily based on total corporate assets rather than revenues. It has sought its corporate advantages principally through political rather than economic means; and, in these terms, one can see retrospectively the true message of previous AT&T administrations. That is, the survival of a monopoly form, to ensure a resonatingly "acoustic" organization.

Again, the Bell Systems, still to be taken as a single technical structure today, is essentially acoustic, and simultaneously it is everywhere at once. It has a 360-degree spatial quality; when you place a call or send print data you are immediately in the center of all the systems. The years of laying cable by engineers and production men, like so many spiders building a web, have given a radiating quality to the organization—one breakdown and the tremor is felt in every corner of that seamless electronic web.

However, this structure is undergoing some change.[27] The Federal Communications Commission and various state public service commissions have had something to do with it.[28] Technological pressure from some small, innovative data-processing companies has had an effect. But the main reason that the original Bell Systems has been changed is the clash of two massive technologies, each of which has its corporate advocates: data processing and high-

speed information transmission. On one hand stand such giants as IBM, Xerox, and Honeywell; on the other, stands the Bell Systems, long clinging to a near monopoly on high-speed network transmission through AT&T.

How did such a confrontation come about? Most experts trace it to the Carterfone decision in 1968, when the FCC allowed Carterfone Communication Corporation to manufacture and sell telephone instruments and other communication terminals of its own design and, further, to hook up such equipment to the Bell Systems network. Hundreds of companies sprang up to do the same, but in the 1980s, the competition for the terminal business narrowed down to those corporate organizations which could fund and build both computerized terminals and networks.[29] The IBM–Aetna Life and Casualty satellite/microwave networks and the MCI special carrier systems may be precursors of the future.

The purpose of this examination, however, is not so much to write an economic history of the Bell Systems as it is to point out an important social consequence of Bell's current metamorphosis, stemming from the divestiture. One way of looking at the telephone infrastructure is to say that it is the "nervous system" of a wired nation. Like highways and railroads, it has tied us together in a special time-space transmission reference. But unlike highways and railroads, which are sequential in a time frame, the telephone creates a special form of instantaneous contact—it shrinks space to nothingness all at once. To nail the point down, let us study for the moment the social impact of the telephone in its simplest state.

Picture, if you will, a relatively calm day in mid-Atlantic around 1845. Two whalers out of New Bedford are trying to heave to, without reducing speed below a quarter, approaching each other from opposite directions. The first ship is just out from port and the other has been at sea for many months. The captains want to exchange news, so they have their seamen haul them up to the first yardarm amidship. Swinging in seat harnesses, both captains use a small megaphone to shout at each other across several hundred feet of water. The exercise was called the "Nantucket Gam." The skill in such a maneuver lay not only in keeping a somewhat straight course, "by and large" (that is, slightly abaft of the wind), but also in the articulation and vocal strength of the skippers.

The telephone, invented by Alexander Graham Bell reportedly

to improve his wife's hearing, is something like this sailing gambit. It is designed to cut through interference over long distances, eliminate spatial distance, and increase the speed of the human voice. It uses electric technology to do this. However, the very act of using the copper wire as an extension of the human voice produces a peculiar result: it obsolesces the human body as hardware, and in that sense brings back our age-old, right-hemisphere affinity for telepathy. Pushed as a technical process to its limit, a reversal effect occurs. Everyone becomes involved in what was originally meant to be a private communication.

That is, the major social effect of the telephone is to remove the identity of the caller. If he is not identified or chooses not to identify himself, he loses touch with a geographic location and a social function. He becomes truly discarnate and, in that psychic sense, uncontrollable—a phone poltergeist, as it were, who occasionally produces the obscene phone call. Bell Systems, however fragmented, is still one of the nation's largest cooperatives and, therefore, has the capacity to cause the rise of large numbers of acoustic ghosts.

The larger you are, the greater your impact on the social structrue. Actually, when an organization becomes the largest economic grouping in the nation, it *is* the social structure. And for this reason, Bell's organizational changes will produce social mutations of some consequence. It will, of necessity, produce a new kind of tribal man, in the original corporate, or group, sense; the kind of person who has survived the excesses of left-hemisphere thinking and who will have retained his respect for the group awareness of the right hemisphere. But such a mutation will take at least a quarter of a century. He or she will be the psychic precursor of the twenty-first-century ethos, which will be largely lived imaginatively on the planet's surface and in outer space.

AT&T cooperating with the Bell Systems will be instrumental in producing the new man precisely because they are on the cutting edge of the future, due to the hybrid power being released by the merger of the digital computer and high-speed transmission equipment. That explosive encounter, birthing all manner of related technologies, will be reinforced by the fact that AT&T/Bell regionals will still be taken as an associative whole, one of the largest socioeconomic groups on the North American continent,

which does not include Bell Canada (767,254 AT&T U.S. employees in 1978; an estimated 315,000 in 1988 after divestiture).

The readjustment battle, which will probably last a generation, will be awesome. A study of the current situation reveals that IBM will probably be the foremost antagonist of the Bell Systems as the technological confrontation moves into the 1990s.[30] IBM will be a lean, wily competitor with an organizational psychology built on salesmanship and rapid equipment turnover, a privilege which only an unregulated corporation could have. The Bell Systems, with a sprawling conglomeration of assets and a ruling concept of maintenance and service (and not marketing), will own something that IBM will try to acquire (and will probably fail to gain)—an exclusive national network of infinite complexity.[31] IBM has been traditionally strong in computer design, especially mainframe and terminals. The strong suit of the Bell Systems has been in long-distance transmission combinations: long lines, microwave, satellite.

In the old days of the West, when the settlers were under attack they would ring the wagons and try to keep the Indians out. If they were greenhorns, they were soon invaded. But as the settlers developed some defense expertise, they invited scouts who knew something of Indian tactics to ride along and help anticipate the redmen's forays. The same thing will happen, and is happening, within the Bell Systems. The AT&T General Department and the former regionally owned and operated telephone companies (OTCs) are hiring executives from the opposition, particularly IBM and Honeywell, to form a defense line against the outside telecommunication rivals. Within a short time, the long-term strategy will shift from defense to aggression as AT&T learns to use the power of its massive corporate assets to relate research and development to marketing techniques. How aggressive AT&T and the Bell Systems can become will depend on heretofore ambivalent FCC policy, which in the beginning mandated AT&T's move away from a noncompetitive atmosphere and into the microelectronic marketplace. As one observer has put it, AT&T is in the difficult position of having to fight with one arm tied behind its back, still hampered by a large corpus of state and federal monopoly regulation.

What will happen to the spun-off Bell Systems internally? First, a great deal of confusion among the middle-level range of man-

agers, whether operational or production-oriented. The average Bell manager, the product of a system of 100 years of right-hemisphere development, is basically a tribal man, taught to maintain an enclosed system and not to be a competitor. The marketing sense will be strange because he or she has been used to responding to calls for service, not finding customers. At the higher echelons, one is more of a mediator, a politician, than a technician. The AT&T General Department in 1979 restructured its administrative group to reflect the new marketing strategy; there are now separate operating divisions for network, business, or commercial customers, and residential phones. Each division has its own sales philosophy. Gradually, each of the twenty-two regional companies (the OTCs), as a result of their legal separation from the General Department, will mirror the head office in each regional area. The strategy specialists, mostly from outside the organization, are essentially "left-hemisphere types."

The mental quality of a person dominated by left-hemisphere thinking is primarily aggressive. The alphabet, from which our form of left-hemisphere thinking springs, produces individualistic thought through its power of abstraction. Using their capacity of categorization and analysis, the left-hemisphere people will reduce the present Bell emphasis on customer service to bottom-line or quantitative results, e.g., "if it doesn't produce a profit, don't do it." The tribal man within the Bell regional OTCs will rebel at first but will gradually be re-educated or eliminated.

In a parallel way, as the regional Bell Systems become more user-oriented, which is the basic touchstone of salesmanship, a great many product lines will develop to fit the "systems design" approach to the customer. Variety in product will cause a new instability at the regional level as each OTC competes to outperform the others. The old hierarchic structure, which depended on loosely related regional organizations, will crack and crumble. AT&T will begin to take on the characteristics of its rivals. All of this will have one root cause—hybridization, the adding to and partial integration of one system with another.

It should be understood that the resultant "child" of hybridization is not the same as either one or the other of its parent systems; for example, the railroad "piggyback," in which a truck body is put on a railroad car. The truck on the railroad car is a hybrid. It does not have the same features as the railroad car or the truck and, hence, is a new entity. As such, it releases new forms of energy. The key to all innovation is a judicious use of parallelism.

Hybridization will force the development of new software, a control mechanism to utilize the new hardware. As more software develops, all hardware will begin to submerge from view, that is, it will become more efficient and breakdown-proof. If IBM keeps ahead of AT&T and Bell Systems in software development, the process of obsolescing the management structure of the old Bell Systems will be accelerated. The rivals will overcome simply by joining AT&T through successful hybridization. In short, after a certain period of instability, AT&T will flip from right-hemisphere dominance to left-hemisphere dominance.

Yet a question arises at this stage. Will the original Bell's customer service be improved by such competition? The answer in the short range is "no." The initial battle of hardware (computer versus rapid data transmission) will end in a merger of ever efficient hardware which by its very durability will cease to gain one's notice, like the can opener and the auto. (The telephone as a single technical instrument has already become invisible.) In the first stage, however, multiple, largely incompatible phone instruments and computerized terminals and allied software will be more vexing than helpful, not to say expensive. In the long run, after the hardware hybridizes and loses visibility, software will finally re-emerge as the key factor. Software, in this case, being the system designed to service the customers' total communication needs in almost an organic fashion.

Now there is one peculiarity about software, particularly in digital computer form, which should receive notice. As it becomes more ubiquitous and easier to use, it intensifies decentralization. Information at the speed of light always tends toward etherealization. At electronic speed all things tend toward an acoustic character and effect. We are now living more in relation to a total environment of electric services (electronic and fiber optic) than our parents were, as they came out of a previous complex of nineteenth-century mechanical services. The new baby Bell Systems have a special sensitivity to this state of affairs.

In fact, Bell Systems managers should use their experience of right-hemisphere thinking to act as a brake or cushion as left-

hemisphere ideas begin to speed the exchange of information. As software becomes more important, a strong movement will begin again in the Bell organizations, probably in the next twenty-five years, to return to an emphasis on right-hemisphere orientation—an action-reaction effect, as it were. Remember, as a general rule of thumb, hardware tends toward centralism and connectiveness (left hemisphere) and software tends toward decentralization and discontinuity (right hemisphere). But software will ultimately produce a climate of diversity in the Bell Systems because its final aim is the servicing of the user.

By pushing service and highly individualized software to the limit, you get diversity, which is the essence of right-hemisphere mentality, the realm of the musician and the artist. Of course, as far as AT&T–Bell is concerned, telepathy is the ultimate software. At present, the telephone is still tied to telegraphy and the electromechanical environment of the nineteenth century. When AT&T begins to comprehend the full power of parallelism between the use of the long lines/microwave, infrared transmission and the satellite there will be a huge reduction in hardware. If AT&T does not, its rivals will.

The movement toward diversity in communications has, as might be expected, been going on for quite some time. For example, during the studio years (1931 to 1945) the Hollywood film studios were keyed to a mass audience. Everybody went to the movies, including the educated, and film scripts contained, accordingly, a commensurate amount of literacy (e.g., *Gone with the Wind*—1939). But as soon as television appeared to further develop the characteristics of a mass medium, movies became specialized according to audience level. The "art film" suddenly appeared; Disney geared films to the pre-teens, etc. The software, in other words, began to diversify more heavily than ever before. The ultimate in software diversity is the private line. The principle comes into play with television as well. Prime time is designed for the mass audience; but cable is designed to fragmentize mass use. The next step in diversity will not be simply distributive, it will be interactive—a condition in which the user merges with the data base or the system.

If AT&T and the Bell Systems want to survive the competitive war of the eighties and become a worldwide power, they will emphasize diversity on a regional basis as their ultimate weapon. The private user (someone who utilizes special home or commercial information services) will be their prime target. The accumulation of large and sophisticated data bases in the late twentieth century will produce planetary home/commercial high-speed information services utilized by the private user to obtain data for direct personal use. This tailored data will tend to give such a user an illusionary sense of a well-defined identity—assuming the information combination is not available in exactly the same pattern provided to someone else—that's the good news.

The bad news is that all persons, whether or not they understand the processes of computerized high-speed data transmission, will lose their old private identities. What knowledge there is will be available to all. So, in that sense, everybody will be nobody. Everyone will be involved in robotic role-playing including those few elitists who interpret or manage large-scale data patterns and thus control the functions of a speed-of-light society. The more quickly the rate of information exchange speeds up, the more likely we will all merge into a new robotic corporate entity, devoid of true specialism which has been the hallmark of our old private identities. The more information one has to evaluate, the less one knows. Specialism cannot exist at the speed of light.

Tetradic Glossary

Equilibrium

(A) Uncertainty: any input amplifies or inflates some situation
(B) Fixity: obsolesces existing homeostasis or balance
(C) Ground: re-creates an older mode of equilibrium
(D) Progressive motion: when pushed to its limits, the system reverses it modalities

Visual Space

(A) Amplifies continuum: space as container (Euclid-Newton)
(B) Obsolesces connectedness
(C) Brings back homogeneity
(D) Reverses into steady state condition: acoustic space

Perspective

(A) Enhances private point of view
(B) Obsolesces panoramic scanning
(C) Retrieves specialism
(D) Reverses into cubism, multi-view

Number

(A) Amplifies plurality; quantity, for example, possessions
(B) Obsolesces notches, ideographs, tallies
(C) Creates math operations: zero, blank, algebraic singularity
(D) Reverses into profile of crowd: pattern recognition

Clock

(A) Amplifies work via the storing of mechanical energy
(B) Obsolesces leisure in the time-regulated city
(C) Retrieves history as an art form; human memory set down through fixed chronology (battles, defeats—1066, 1763, 1945, etc.)
(D) Reverses into the eternal present via simultaneous pattern recognition (myth), such as the seventeenth-century "Sacrament of the Present Moment" Benedictine monks: "Laborare Est Orare"

Copernican Revolution

(A) Enhances role of the sun (central)
(B) Pushes aside the crystalline spheres
(C) Retrieves theories of Aristarchus of Samos (275 B.C.)
(D) Flips into relativity—centers everywhere and margins nowhere (acoustic space)

Periodic Tables

(A) Intensifies classification
(B) Pushes out alchemy
(C) Retrieves the idea of families and of structures; reopens search for underlying unity
(D) Reverses into wave theory of Erwin Schrodinger

Atomic Structure

(A) Enhancement by atomic combination
(B) Obsolesces the four elements of the Greeks
(C) Retrieves the ancient atomist theory
(D) Flips into contemporary atom of Leucippus and Democritus in the form of solar structure (Newtonian theory/Niels Bohr)

Mirror (*Mirari:* to wonder)

(A) Enhances ego by repetition and self-advertisement; echo-matching of a figure-minus-its-ground instrument for self-portraiture—Rembrandt, etc.; adjunct of phonetic literacy via visual intensity: tunnel vision

(B) Obsolesces the corporate mask and corporate appearance (costume); personal dress replaces costume
(C) Retrieves the mode of Narcissus (magic, metaphoric tunnel vision) (self-portrait: mirror as sitter, painter as audience and as admirer)
(D) Reverses into "making" process as recognition, replay; outlook · becomes insight

Metaphor

(A) Enhances awareness of relations
(B) Obsolesces simile, metonymy, connected logic
(C) Retrieves understanding, "meaning," via replay in another mode
(D) Reverses into parallelism, allegory

Spoken Word (Mirror of the mind: *canon* is mirror of the voice, when one voice repeats or reflects

(A) Enhances self-awareness: consciousness what another has stated)
(B) Obsolesces the sub-human
(C) Retrieves past experience
(D) Group competitiveness and class structure

Printed Word

(A) Amplifies private authorship, the competitive goal-oriented individual
(B) Obsolesces slang, dialects, and group identity, separates composition and performance, divorce of eye and ear
(C) Retrieves tribal elitism, charmed circle, cf., the "neck verse"
(D) With flip from manuscript into mass production via print comes the corporate reading public and the "historical sense"

Crowd

(A) Intensifies need to increase
(B) Obsolesces private identity
(C) Retrieves paranoia
(D) Reverses into violence: fear of decrease

Clothing

(A) Amplifies private energy: clothing as weaponry
(B) Obsolesces climate: clothing as thermal control
(C) Brings back mask, trophy, group (corporate) energy
(D) Flips into conventional attire (IBM dress code)

Housing

(A) Private enclosed visual space ("Three Little Pigs")
(B) Cave, tent, wigwam, dome
(C) Wagon trains, covered wagons (pioneers), mobile home clusters
(D) Corporate identity in high-rise

City

(A) Intensifies the centralizing of all human activities
(B) Obsolesces the countryside, the rural
(C) Retrieves homeostasis—"bustle"
(D) Reverses into suburb: breakdown of centralism

Elevator

(A) For mines: enhanced depth—real "low down"
(B) Steps, ladders—gravity, that is, levity
(C) Retrieves hidden treasures as well as hierarchy
(D) Flips into high-rise: new egalitarianism of elevator

High-Rise (Skyscraper)

(A) Amplifies privacy
(B) Obsolesces community
(C) Retrieves catacomb—an apartment is not a home
(D) Reverses into slum: community in crisis

The Wheel

(A) Accentuates locomotion
(B) Obsolesces sled, roller, greased skids, etc.
(C) Retrieves roads as rivers (moving sidewalk), skis, snowmobiles
(D) Reverses into airplane, via bicycle

Compass

(A) Enhances range and accuracy of navigation
(B) Obsolesces stars
(C) Retrieves astronomy as art form
(D) Reverses into electric environment: circuitry as exo-nervous system (cosmic ground)

Cash Money

(A) Speeds transactions
(B) Obsolesces barter
(C) Retrieves conspicuous consumption
(D) Reverses into credit or non-money

Credit

(A) Enhances inflation, through indebtedness
(B) Obsolesces sole ownership; encourages rent-all
(C) Retrieves cashless society; brings back barter and do-it-yourself
(D) Flips into bankruptcy

Pension

(A) Enhances image of future security
(B) Obsolesces thrift as survival mechanism
(C) Retrieves "Garden of Eating" (consumerism)
(D) Pushed far enough results in indigence

Gun Powder

(A) Extends the range of any steel-cased projectile
(B) Obsolesces individual personal combat
(C) Brings back the "Superman"—the group charge
(D) Flips into total automated death

Steamboat

(A) Opened the sea for hardware
(B) Obsolesced the wood/sail craft, fostered uncertainty and exploration
(C) Created tourism: programmed pilgrims

(D) Flipped to centralism via iron sea power (vs. old decentralization of sail sea power)

Railway

(A) Improves horizontal locomotion; increases speed
(B) Obsolesces the sled, roller, wagon, stage
(C) Brings frontiers within reach; retrieves ease of river traffic, like moving sidewalk
(D) Reverses into the airplane, via bicycle

Telegraph

(A) Amplifies the isolated incident into an inclusive dateline; shifts front-page content from analysis to instant reporting
(B) Obsolesced the Addison and Steele style newsheet, and the private point of view
(C) Retrieved corporate or group involvement, whereby, for example, Baltimore was instantly apprised of Washington congressional events (1844)
(D) Reverses into a dynamic broadcasting mode; newspaper front page becomes a mosaic of unrelated time-based items

Camera

(A) Snapshot enhances aggression of individual user; Locke model of mind as reflection
(B) Obsolesces privacy of subjects, providing ego trip
(C) Retrieves past as present; retrieves tribal corporate image state; ego trip for subject
(D) Reverses into public domain—photo journalism and cinema

Electric Light

(A) Amplifies space as a visual figure and turns it into ground; instant night into day
(B) Obsolesces the mystery of the nonvisual; also, candles, lamps, oil, gas
(C) Retrieves daytime activities on grand scale, i.e., night baseball; puts outer (sun) light inside for detailed manipulations, e.g., brain surgery
(D) As Lusseyran says, reversal is blinding: outer vision is converted to inner trip; figure and ground merge

Automobile

(A) Enhances privacy: people go out in their cars to be alone
(B) Obsolesces the horse-and-buggy, the wagon
(C) Retrieves a sense of quest: knight in shining armor
(D) Pushed to its limit, the car reverses the city (urb) into the ex-urb (suburbs); brings back walking as an art form

Zipper

(A) Amplifies grip, clasp
(B) Obsolesces buttons, snaps
(C) Brings back classic, flowing robes
(D) Flips into (velcro) adhesive

Airplane

(A) Amplifies vertical and horizontal locomotion
(B) Obsolesces the wheel and the road, the railway and the ship
(C) Brings back aerial perspective with the aura of miniaturization
(D) Reverses into guided projectile; transforms planet into extended city; urb orbs

Electric Media

(A) Amplification of scope of simultaneity and service environment as information
(B) Obsolesces the segmented visual, connected, and logical
(C) Retrieves the subliminal, audile-tactile dialogue
(D) Etherealization: the sender gets sent

Microphone—PA System

(A) Amplifies individual speech and tonal variety
(B) Obsolesces the big band, the Latin mass, grand opera
(C) Brings back group participation; rhythmic replay
(D) Flips from private to corporate sound-bubble

Radio-Television

(A) Improves (regional) simultaneous access to entire planet—everybody: "On the air you're everywhere"

(B) Obsolesces wires, cables, and physical bodies
(C) Retrieves tribal ecological environments: echo, trauma, paranoia, and also brings back primacy of the spatial, musical, and acoustic
(D) Reverses into global village theater (Orson Welles's *Invasion From Mars:* no spectators, only actors)

Xerox

(A) Increases speed of printing process
(B) Obsolesces assembly-line book
(C) Brings back oral tradition, the committee
(D) Reversal is "everybody a publisher"

Instant Replay

(A) Instant replay of experience equals the cliché; amplifies cognitive awareness
(B) Wipes out the merely representational and chronological
(C) Retrieves "meaning" (I. A. Richards)
(D) Flips from individual experience to pattern recognition, the nature of the archetype

Committee

(A) Enhances group image of authority
(B) Obsolesces individual responsibility
(C) Brings back dialogue
(D) Reverses from specialized job to corporate role

Telephone

(A) Enlarges the impact and speed of the private voice
(B) Erodes the body as hardware; creates the disembodied consciousness
(C) Retrieves sense of telepathy
(D) Reverses into the party-line; omnipresence, like the conference call or teleconferencing

Computer

(A) Accelerates logical sequential calculations to speed of light
(B) Erodes or bypasses mechanical processes and human logic in all sequential operations

(C) Highlights "numbers is all" philosophy, and reduces numbering to body count by touch
(D) Flips into the simultaneous from the sequential; accentuates acoustic over visual space to produce pattern recognition

Cable TV

(A) Amplifies quality and diversity of signal pickup
(B) Obsolesces diffusion broadcasting
(C) Retrieves early transmission broadcast pattern point-to-point (ship to shore)
(D) Reversal is flip to home broadcasting

Teletext

(A) Printed radio: enhances headline service, like early radio, e.g., H. V. Kaltenborn
(B) Obsolesces prolonged TV watching; viewer uses service selectively for short intervals
(C) Retrieves silent film dialogue card, pictograph or pun style; teletype format
(D) Reverses into interactive video-text; qualitative data filter, via data bank

Electronic Fund Transfer (Data base)

(A) Enhances flow of goods and services via phone lines and data base
(B) Obsolesces barter and cash money
(C) Retrieves ostentatious show, along with credit overload
(D) Reverses into an intense state of creditworthiness as pure status (non-money)

Satellite

(A) Enlarges global information exchange
(B) Obsolesces language for images (digital over analog)
(C) Retrieves world view, like earlier compass
(D) Reverses into iconic fantasies

Global Media Networking

(A) Instantaneous diverse media transmission on global basis: simultaneous planetary feed and counter-feed
(B) Erodes human ability to code and decode in real time
(C) Brings back Tower of Babel: group voice in the ether
(D) Reverses into loss of specialism; programmed earth

Notes and References

For brevity, the main references herein are referred to under the author's name and main title, except where further particulars are needed for identification. Full details will be found in the bibliography.

Chapter 1. The Resonating Interval

1. Left and right brain cognitively function diachronically and synchronically. Though the hemispheres are asymmetrical in sensory preference they cooperate for psychic unity. "Diachronic" is here meant to denote the experiencing of an idea or object in sequential time (i.e., day by day). "Synchronic" means the collective experiencing of an idea and object over a period of years (i.e., from epoch to epoch). Such is the difference implied in analytical psychology between individual consciousness and Jung's "collective unconscious." Cf. Joseph Bogen's ruminations concerning the opinions of such diverse figures as Jerome Bruner, Joan Miro, and Henry Moore on the role of the appositional synchronic mind in creativity; "The Other Side of the Brain, III: The Corpus Callosum and Creativity," pp. 198–202. Also consult Barrington Nevitt's review of synchronic and diachronic structures in the work of Descartes, Saussure, and Lévi-Strauss, *The Communication Ecology*, pp. 51–57.

2. Resonating interval as borderline: The bias of visual space—diachronic—is related to the sensory preference of labeling and hierarchy in the left hemisphere (the linear-quantitative). The bias of the right hemisphere is primarily gestalt—synchronic—or pattern formation (configurational-qualitative), i.e., the singular element as opposed to the holistic. The propositional/diachronic mind cooperating with the appositional/synchronic mind enables the human consciousness to di-

Chapter 5. Plato and Angelism

1. Eric Havelock, *Preface to Plato,* pp. 45, 47.
2. Alexander R. Luria, "The Functional Organization of the Brain," in *Scientific American* (March, 1970), pp. 21–71. Harold A. Innis remarked on the Oriental (right-hemisphere) antipathy to sequence and abstraction and Western precision. Cf. *The Bias of Communication,* p. 62.
3. Havelock, *Preface to Plato,* pp. 285–286.
4. Ellul, *Propaganda,* pp. 108–109.
5. Karl Popper, *The Open Society and Its Enemies,* p. 183.
6. Popper, *The Open Society and Its Enemies,* pp. 183–184.
7. Popper, *The Open Society and Its Enemies,* p. 178.
8. Chiang Yee, *The Chinese Eye: An Interpretation of Chinese Painting,* pp. 189–190.
9. Tony Schwartz, *The Responsive Chord,* pp. 14, 16.
10. Herbert Krugman, from a paper delivered to the annual conference of the Advertising Research Foundation, October 1978. See also, Barry Siegal, "Stay Tuned for How TV Scrambles Your Brain," in the *Miami Herald,* Sunday, June 3, 1979, p. C10. Krugman's original report was presented as a paper to the annual conference (1970) of the American Association for Public Opinion Research, entitled "Electro-encephalographic Aspects of Low Involvement; Implications for the McLuhan Hypothesis."
11. On near-point vision and the incidence of dyslexia, see Barrington Nevitt's remarks on Arthur Hurst's hypothesis in *The Communication Ecology,* pp. 60–61. Near-point vision in this context refers to the propensity of some children to read with one eye only, with its possible connection to early and intense television viewing.
12. Ruth Benedict, *The Chrysanthemum and the Sword,* pp. 247–248.
13. Okakura Kakuzo, *The Book of Tea,* p. 44.
14. Kakuzo, *The Book of Tea,* pp. 44–45.
15. Kakuzo, *The Book of Tea,* p. 46.
16. Benedict, *The Chrysanthemum and the Sword,* p. 249. "On" is an obligation passively incurred (cf. p. 116.)
17. Benedict, *The Chrysanthemum and the Sword,* p. 251.
18. Benedict, *The Chrysanthemum and the Sword,* pp. 196–197.

Chapter 6. Hidden Effects

1. Chiang Yee, *The Chinese Eye,* pp. 114, 115.
2. Fritjof Capra, *The Tao of Physics* (Preface), pp. 11–12.

3. Innis, *The Bias of Communication* (regarding the Oriental circularity of time), pp. 62, 63.
4. Joseph E. Bogen, *The Human Brain,* p. 141.
5. Jacques Lusseyran, *And There Was Light,* pp. 143–144.
6. Lusseyran, *And There Was Light,* p. 32.
7. Warren Weaver, in *The Mathematical Theory of Communication* by C. E. Shannon and W. Weaver, pp. 7–8. Both Shannon and Weaver use the same depiction of a medium.
8. C. E. Shannon and W. Weaver, *The Mathematical Theory of Communication,* p. 32.
9. Mario Bunge, *Causality: The Place of the Causal Principle in Modern Science,* p. 32. Vide Aristotle, *Metaphysics,* Book I, ch. iii, 938a, b; Book V, ch. ii, and Aristotle, *Physics,* Book II, chs. iii, vii.
10. Cf. Aristotle, *Generation of Animals,* trs. A. L. Peck (Loeb Library, 1943), pp. xliv, 3. Aristotle opens Book I by presenting formal cause as "the *logos* of the thing's essence." Edition cited, London: William Heinemann Ltd.; Cambridge: Harvard University Press, 1943.
11. W. K. Wimsatt, Jr., and C. Brooks, *Literary Criticism—A Short History,* p. 709. In their footnote, the authors cite Frye's "My (Critical) Credo," *The Kenyon Review,* XII (Winter, 1951): 91–110, and add: "Archetype" borrowed from Jung, means a primordial image, a part of the collective unconscious, the psychic residue of numberless experiences of the same kind, and thus part of the inherited response pattern of the race.
12. N. Frye, *Anatomy of Criticism: Four Essays,* p. 132. Vide the discussion in *From Cliché to Archetype* by H. M. McLuhan and W. Watson (1970).
13. The book of nature: For over a thousand years, based on the book of Genesis, the West has propounded a theory of nature as one of the forms of divine revelation. There were two "books," the book of nature and the book of Scripture, parallel texts in different idioms as it were, both subject to exegesis. Shakespeare frequently alludes to this tradition of multi-level exegesis. For example, in *As You Like It* the exiled Duke remarks to his companions that words

> are counsellors
> That fleetingly persuade me what I am. . . .
> And this our life, exempt from public haunt,
> Finds tongues in trees, books in the running brooks,
> Sermons in Stones, and good in everything.
> (II.1.10–17)

The book of nature was an encyclopedia of being: only God spoke in events. In the minds of the people of the Middle Ages every event,

every case, fictitious or historic, tends to crystallize, to become a parable, an example, a proof, in order to be applied as a standing instance of a general moral truth. In the same way every utterance becomes a dictum, a maxim, a text. For every question of conduct, Scripture, legends, history, literature furnish a crowd of examples or of types, together making up a sort of moral clan, to which the matter in question belongs. Cf. J. Huizinga, *The Waning of the Middle Ages*, p. 227.

14. Bunge, *Causality*, pp. 32–33.

15. Joseph Bogen in *The Human Brain*, p. 145 notes: "Although humans of any culture, so far as we know, have the potential for reading and writing, many remain non-literate and thus fall short of acquiring the most special of left-hemisphere functions. Conversely, we can readily comprehend the concept of a society in which right-hemisphere illiteracy is the rule. Indeed, our own society (admittedly complex) seems to be, in some respects, a good example: a scholastized, post-Gutenberg-industrialized, computer-happy exaggeration of the Graeco-Roman penchant for pro-positionizing."

Chapter 7. Global Robotism: The Satisfactions

1. For a précis of general economics, art, and thought of the first industrial revolution in Europe and its effects on North America (1750 to 1870), see Wallbank, Taylor, and Bailkey, *Civilization: Past and Present* (vols. I and II combined), pp. 472–500, with special reference to European population estimates, 1800 to 1900. Population size and growth projections in this book are partially based on *The Global 2000 Report to the President* (1980), produced by the Council on Environmental Quality and the Department of State, updated by the most recent world population studies (1983) done by the U.S. Bureau of Census; with occasional reference to supplementary fertility and immigration figures by the U.S. Social Security Administration (1980). Cf. *The Global 2000 Report to the President: Entering the Twenty-first Century*, 1980; vol. I (Summary), vol. II (Technical Reports), vol. III (Documentation—Global Models); *World Population, 1983, Recent Demographic Estimates for the Countries and Regions of the World*, 1983; *U.S. Population Projections for the OASDI Cost Estimates, 1980.* Population estimates for the Los Angeles and Dallas–Forth Worth areas were taken from the 1986 Consolidated Statistics for Metropolitan Areas (CSMA), U.S. Census Bureau, Washington, D.C. World population estimates were coordinated with the *United Nations World Demographic Estimates and Projections*, 1950 to 2025, as well as *Trends and Opportunities Abroad*, published by American Demographics, Inc., Ithaca, New York, 1988. (1986–88 demographic statements were updated with the assistance of Brad Edmondson, Senior Editor, *American Demographics* magazine.)

2. "An image is created every 1/30th of a second—the time it takes for two complete sweeps of the screen. At any one moment, however, there is never more than one dot of light glowing on the (tv) screen. We see an entire image because the brain fills in or completes 99.999 percent of the scanned pattern each fraction of a second, below our awareness. The only picture that exists is the one we complete in our brains. . . ." Television viewing is principally a right-hemisphere activity because of its audile-tactile quality. Joyce Nelson, "As the Brain Tunes Out, The TV Admen Tune In," *The Toronto Globe and Mail*, April 16, 1983.

3. Consult proceedings papers of the 1979 convention in Las Vegas (Vision '79), primarily a newspaper clipping collection entitled "Speaking of Cable," distributed by the National Cable Television Association, Washington, D.C., for future cable penetration predictions (1980–90). Marshall McLuhan attended as a principal speaker.

4. On the consumer as instant producer, cf. *The Communications Revolution and How It Will Affect All Business and All Marketing* by E. B. Weiss, esp. pp. 22–29.

5. On the impact of fiber optics as information technology, refer to *The New Television Technologies* by Lynne Schafer Gross, pp. 147–148.

Chapter 8. Global Robotism: The Dissatisfactions

1. Fossils not molecular dating of evolution says McLuhan are still the best indicators of how man created his own survival environment. Cf. Nigel Calder, *Timescale: An Atlas of the Fourth Dimension* (1983), pp. 270–271, 279–280. See the discussion on "Human Origins," pp. 241–242, and earliest agriculture, "Genes and Travelers," pp. 88–89. Also see discussion of civilization as an artifact, Simeons, A. T. W., *Man's Presumptuous Brain*, pp. 69–79, consult Lorenz, Konrad, *On Aggression*, esp. pp. 176, 210–211.

2. The West has nevertheless been more open to innovation than the East. See "Medieval Roots of Modern Technology," by Lynn White, Jr., in *Medieval Religion and Technology*, pp. 75–91, esp. pp. 78–79.

3. *Sensus communis:* the translation of all the overt senses (seeing, hearing, tasting, smelling, and touch) into a form of synesthesia. Cf. Chapter 1.

4. The United States since Monroe's time has pursued a rationalistic military policy in Central America. Note Walter La Feber's explication of the history of Bluefields on the Miskitos Coast of Nicaragua and American covert support of Juan Estrados's revolt against the incumbent ruler, Jose Santos Zelaga, with the subsequent arrival of the U.S. Marines, in *Inevitable Revolutions—The United States in Central America,* pp. 28–68. Central America is essentially tribal (right-hemisphere).

5. On African and Asian population growth, refer to broad predictions of *Global 2000,* esp. p. 1, vol. I, and p. 25 of *World Population, 1983* with special figures on international migration, pp. 45, 55–180, 185, 195–296. By the year 2020, world food production will have achieved an overall growth rate of less than 15 percent. Most of the growth will benefit countries with high per capita food consumption; cf. *Global 2000,* p. 2.

6. On Mexican population growth rates, see *World Population, 1983,* pp. 384–385, for rate of projected population estimates.

7. Cf. Christopher Lasch, *The Culture of Narcissism.* In the original version of Narcissus, Zeus makes the youth's reflection in the water appear as the face of a stranger—infatuation rather than self-love. Delusion or not, Narcissism is a "closed system," like the videogame player. Robotism tunes one to the culture.

8. Jerzy Kosinski's ironic theme in *Being There,* a novel about a man who preferred the inside world of the television set to the outside world of people. Fantasy involves only disconnected images; dreams usually are involved with working out the problems of the real world in "reel" time, like motion pictures.

9. Throughout the 1970s Marshall McLuhan classified the computer, as with any servomechanism, as a by-product of automation, which springs from the very nature of electricity. Electricity, like light, he said, illuminates everything it touches (like an electron emitting light as it moves), impelling us to become aware of the total process (circuit) at once. Cf. "Automation," *Understanding Media.*

10. The information on program monitoring vs. systems analysis came from conversations with David Curtis, Systems Engineer, *Com-Pro*/Meszaros Associates, Inc., Buffalo, New York; 1977–84.

11. Brain structure and the computer: A rough simile can be drawn between the structure of the brain, including the central nervous system, and the computer. Memory and storage could be said to perform the functions of the left hemisphere. The CPU, or central processing unit, is the right hemisphere because it "sees" the operation of the entire machine by virtue of the program. The corpus callosum, or fibrous bridge between the left and right brain, can be compared to the regulation of input and output levels, both internally and externally.

12. The Pythagorean elite: It is but a short step from a general sense of holism (the printout as pattern) to the number mysticism of the *tetraktys,* the ancient concept of the golden section and the harmony of the spheres. If computer education remains limited, by design or neglect, to a small part of the population, systems analysts may arise as high priests of yet another wave of neo-Pythagoreans, as bellwethers of the corporate state.

13. Security and encryption: Encryption equipment, now being manufactured by IBM, Motorola, and Datotek, attached to any voice, data, or video mode, can mask or scramble transmission signals (including whole patterns of transmission) and then unmask or unscramble them at the reception point. Encryption is very expensive, roughly $5000 a line; hence, computer network transmission growth will outrun security device installation in the foreseeable future.

14. Cf. J. F. Crean, "Automation and Canadian Banking," *The Canadian Banker and the ICB Review,* vol. 85, no. 4 (July-August 1978). Cf. J. F. Crean, "The Canadian Payments System," *The Canadian Banker and ICB Review,* vol. 85, no. 5 (October 1978). On high-velocity money see James Martin, *Future Developments in Telecommuications,* pp. 243–244, 253–256.

15. J. F. Crean, "The Canadian Payments System," pp. 20–27; see p. 22 for a contrast with the U.S. payments procedure. Also, cf. J. F. Crean, "EFTS and the Canadian Payments System," *The Canadian Banker and ICB Review,* vol. 85, no. 6 (December 1978).

16. James Martin, *Future Developments in Telecommunications,* pp. 240–241, 244–246. See also J. F. Crean, "Automation and Canadian Banking," pp. 16, 20.

17. J. F. Crean, "Contrasts in the National Payment Systems," *The Canadian Banker and ICB Review,* vol. 86, no. 1 (February 1979): 19.

18. James Martin, *Future Developments in Telecommunications,* pp. 241, 243–244, 247–249, 251–252, 256–257. The inability of national states to prevent the flow of key economic, social, and military information by electronic fund transfer nets is highlighted in current computer networking research; cf. "How Do We Best Control the Flow of Electronic Information Across Sovereign Borders," *AFIPS Conference Proceedings,* vol. 48, 1979 (National Computer Conference, '79), pp. 279–282.

19. The military man in the Western world is educated to understand that he is in a constant state of warfare in which the object is to

consistently set up "boxes" of territory to defend. His psychology is essentially Euclidean, or left-hemisphere. The recent failure of most space allocation conferences underscores the current game of trying to set up direct pipelines of radio links in near space, undisturbed by the competition. Cf. *INTELSAT*, pp. 194–196, and Sandra Hochman's *Satellite Spies*.

20. In 1977, Grumman Aerospace engineers envisioned, for NASA, the placement of a vast thirty-one-ton triple-antenna space platform containing some earth station switching capacities, which could be used to set up a "national information service: for several thousand pre-designated individuals who would receive messages on two-ounce transceivers," functioning for "twenty continuous hours." See in-house publication: *Horizons*, Grumman Aerospace Corporation, Bethpage, New York (Spring 1977).

21. The area around the planet is theoretically unlimited; however, the near-term possibility of a collision between space vehicles is nevertheless very plausible. Nearly 6000 satellite objects have gone into near-earth space since 1957. By 1988, the number of man-made satellites in low orbit, irregular or otherwise, could well total over 10,000. Nuclear accidents such as COSMOS 954 (January 24, 1976), which scattered radioactive materials over hundreds of square miles of Canada's Northwest Territory, can only increase in frequency. Hence larger satellites move into higher geosynchronous orbit. See Leo Heaps's documentation in *Operation Morning Light*.

22. The problem of signal spectrum congestion is a real one today. The nations of the Northern Hemisphere, which include Japan, the USSR, Canada, Britain and the United States, are the prime users of the geostationary orbit and, as a rule, have their satellite transponders all pointed in the same direction. Cf. *Computing Canada*, Conference Issue (November 1981).

23. On continent/global satellite communications, cf. *Telecommunications: Trends and Directions*, Seminar Program, Electronic Industries Association (1981), pp. 61–68, with supplementary reference to *A History of Engineering and Science in the Bell System: (1925–1975)*.

24. Global AT&T: Since 1982, the corporate logo for American Telegraph and Telephone has been a serrated globe, signaling the long-range intentions of the company. In many company ads the invention of the 256K memory chip is linked with the declaration, "The AT&T Communications network . . . delivers voice, video data, even sensory information to every corner of the world and employs every advanced technology from lightwave systems on earth to satellites in space." (Microelectronics, photonics, digital systems, software). At 315,000 people (1988), AT&T is still one of the largest and most technically complex multi-media electronic carrier corporations, excluding the seven U.S.-based "baby Bell" regional company groups.

25. The social implications of split-brain research, detailed in Chapter 4, are explored in Norman Geschwind's "Language and the Brain," *Scientific American* elaborated in (April 1972) and David Galin's "Hemispheric Specialization: Implications for Psychiatry," *Biological Foundations of Psychiatry* (1972).

26. As a good example, a public relations publication put out by New York Telephone called "Fire: The Second Avenue Story," which describes the impact on lower Manhattan of a fire in a telephone exchange (New York Telephone, 1975).

27. Special report: "Behind AT&T's Change at the Top," *Business Week* (Nov. 6, 1978), pp. 114–115. Also, effects of divestiture reorganization on economy and business, *Time*, November 21, 1983, pp. 60–74.

28. AT&T core network and divestiture: The reorganization of the 22 local operating companies into seven regional holding groups, anticipated by Marshall McLuhan in 1978, will have little immediate technical effect on the U.S. core transcontinental communications network, now dominated by AT&T. As long as the AT&T Long Distance Division, with its regional ESS-4 computer-exchange hubs (allied with critical military net systems) remains intact, the divestiture only serves to free AT&T to expand technologically into global networking and world software services. Much of the fixed assets divested domestically by the old AT&T were superannuated and returned less than 5 percent on investment annually. The development of new digital transmission techniques, more advanced than those used by the Jet Propulsion Laboratories for "imaging" on the Voyager I and II tours through the solar system (imaging: computer assisted digital return of TV and radio signals) will place AT&T in the lead in creating an intra-satellite global network outrivaling anything developed domestically by such groups as IBM, MCI and GTE. For a veiled statement of AT&T intentions see the 1983 *AT&T Annual Report* (98th Annual Stockholders Meeting), April 20, 1983, pp. 4, 21, 23.

29. Cf. Clare D. McGillem and William P. McLauchlan, *Hermes Bound: The Policy and Technology of Telecommunications*, pp. 167–168, 172–174. In addition, pp. 173, 175, 183 for details of the DATRAN failure to sustain network capability.

30. On IBM sales aggressiveness cf. *1982 Annual Report to IBM Stockholders*, April 25, 1983, pp. 10, 23, 24, 29.

31. 1982 IBM *Annual Report* (Satellite Business Systems), p. 10.